

Energy West Mining Company

Division of Oil, Gas & Mining 1998 Annual Report

1998 VEGETATION MONITORING REPORT

- ⇒ **DEER CREEK MINE ACT/015/018**
- ⇒ **DES-BEE-DOVE MINE ACT/015/017**
- ⇒ **COTTONWOOD/WILBERG MINE
ACT/015/019**
- ⇒ **TRAIL MOUNTAIN MINE ACT/015/009**



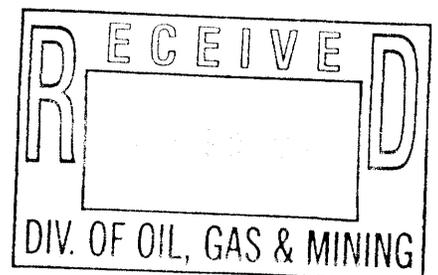
PACIFICORP



*PACIFICORP/ENERGY WEST
VEGETATION MONITORING
1998*

VOLUME I

*VEGETATION MONITORING REPORTS FOR THE
COTTONWOOD MINE, DES-BEE-DOVE, DEER CREEK MINE,
TRAIL MOUNTAIN MINE, COTTONWOOD CANYON & RILDA CANYON*



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Report Date
March 1999



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INTRODUCTION

The following document addresses the results of vegetation monitoring of seeded areas and revegetation test plots results for 1998. The following is a list of areas monitored and reported within this document.

Cottonwood Mine Area

Old Fan Road
Reference Area
4th East Road
Storage Yard Slope
Parking Lot Slope
Road/Silo Pad Slope
Tipple Area Slopes
Sediment Pond Banks
Ninth East Road Breakout
Test Plots '88
Waste Rock (Old) Cell 1
Waste Rock (Old) Cell 2
Waste Rock (Old) Cell 3
Waste Rock (Old) Cell 4
Waste Rock (Old) Cell 5
Waste Rock (Old) Cell 6
Waste Rock (Old) Cell 7
Waste Rock (Old) Berm 1
Waste Rock (Old) Berm 2
Waste Rock (Old) Berm 3
Waste Rock (Old) Berm 4
CTW Reference Area
CTW Soil Piles (A,B,C) '94
Waste Rock (New) Road Slopes
Waste Rock (New) Topsoil Stockpiles
Waste Rock (New) Subsoil Stockpiles
Waste Rock (New) Sediment Pond Banks
Refuse Berm 1991
Refuse Berm 1994
Refuse Berm 1996

Cottonwood Canyon

Fan Portal Reclaimed Slope
Soil Piles
Reference Area
Tube Conveyor Slope
Belt Portal
Portal (Diesel)

Des-Bee-Dove Area

Beehive Yard Slope
Beehive Road Berm
Deseret Road Berm
Portal Road Berm
Bathhouse Road Berm
Tipple Slope
Sediment Storage Slope
Sediment Pond Banks
Haul Road Bench
Beehive Substation Slope
Sediment Pond Area
Bathhouse Slope
Material Yard Slope
Test Plots '89
Test Plots '92

Deer Creek

Riparian Areas
Sediment Pond Dam
Temp. Sediment Basin
Roadside Areas
Gate Areas Slope
Fan Road Slopes
Refuse Pile and Berm
Rock Slide and Berm
Water Plant Slope
Pipeline
Deer Canyon
Waste Rock Access Road Slopes
Phase I Berm
Phase I Diversion

Rilda Facilities Area

Pad Area Slopes '96
Roadway Slopes
Topsoil Pile '95

Trail Mountain Mine

Sediment Pond Outslope
Parking Lot Ext. '96

METHODS

Vegetation monitoring was conducted on revegetated sites and test plots for PACIFICORP (ENERGY WEST) in the growing season of 1998. Quantitative and/or qualitative data were taken on each site, depending on the monitoring schedule. In other words, quantitative data sampling was not scheduled this year on some sites. Each data sheet will briefly describe the sample parameters specific to that site.

QUALITATIVE DATA

Qualitative data were recorded on all sites. A qualitative data sheet for each site is included in this report and provides the following information: site name, general area, sample date, observers, slope, exposure, acreage, animal disturbance, erosion damage, cover, dominant plant species observed, and other pertinent notes.

When quantitative data were recorded, results are shown on these data sheets or reference to where the data is located.

Site Name

The site name that is given correlates with PACIFICORP'S (ENERGY WEST'S) maps of the area and can be used for future reference and sampling.

Area

The "Area" on the data sheets is a reference to the general mine or property areas for quick reference and general use.

Date

Sample dates are also provided. All sample dates are within the 1998 growing season.

Workers

Lists the names of the individuals who recorded the data.

Exposure

Exposure was recorded on each site. Often the site had several exposures differences. In those cases, "variable" was written for the exposure on the data sheet.

Animal Disturbance

Values were given to the relative use by animal species at each site. The values and a brief explanation are given below.

- None - no animal use was observed.
- Slight - only little animal use was observed by droppings, tracks, or cropped vegetation.
- Moderate - a fair degree of use was observed, mostly by the cropped vegetation. Several inches of production still remained available for use by the animals.
- Severe - animal use had taken nearly all of the available current year's production.

Erosion

Erosion of the area was also assessed by qualitative methods. Actual measurements, descriptive notes or values described below were given to each site.

- None - (or negligible) no erosion was observed.
- Slight - small erosion rills beginning, usually less than 2:1 (2 inches wide by 1 inches deep).
- Moderate - erosional rills and gullies from 2:1 to 4:2.
- Severe - erosional rills and gullies over to 4:2 were observed.

Cover

Cover differences or notes may be given on the data sheet or references to the quantitative data.

Dominant Plant Species Observed

Sometimes plant species that were observed, but were not encountered in the quadrats when sampling. Many of these species were recorded here. However, some of the species were also encountered in the quadrats. Therefore, for a list of all species on a given site, one should refer to both quantitative and qualitative data sheets.

Notes

Site-specific, pertinent notes about each area were also taken i.e. identification of special considerations, areas of differential growth patterns, etc. Notes on specific methodologies on each site were also described here.

Photographs

Color photographs were taken for each site and are included in this report for documentation.

QUANTITATIVE DATA

Cover and Composition

Cover estimates were made using ocular methods with randomly or regularly placed meter square

quadrats. Total living cover, litter, rock and bareground were recorded. Cover by species was also recorded. Raw data summations were included in this report. They provide all means and standard deviations. Species composition was also assessed from the quadrats. Sample sizes were often kept consistent each year. Because these data are presented to observe only trends for revegetation success and soil stabilization, no attempt was made to achieve sample adequacy for each individual site.

Woody Species Density

In some areas woody plant densities estimates were needed. Densities were recorded using the point-quarter distance method (Cottom and Curtis 1956), belt transects, or in some cases, counting the entire population of a given area. In the point-quarter method, random points were placed on the sample sites and measured into four quarters. The distances to the nearest woody plant species were then recorded in each quarter. The average point-to-individual distance was equal to the square root of the mean area per individual.

In the belt transect method, sizes of transects varied with individual sites. In this method total counts of the woody species were conducted in each transect. They were then summed and averaged to calculate the number of individuals per acre.

Productivity

Total annual biomass was estimated by clipping, drying and weighing current annual productivity. When there was enough space within the sample area, "double sampling" or relative ocular estimates were also made placing four quadrats near the "clipped" quadrat to increase accuracy of the productivity estimates. In other words, one quadrat was placed. From this sample, four more quadrat estimates were made relative to the first quadrat. Biomass from the first quadrat was clipped and weighed.

RESULTS

To be consistent with previous years, data sheets for qualitative and quantitative (including raw data) sampling are included in this report. This gives the reviewer an overall view of the revegetation success of each area. For results of the above parameters, refer to the site-specific data sheets.

COTTONWOOD MINE AREA

PACIFICORP (ENERGY WEST)
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1998

SITE NAME: Old Fan Road

AREA: Cottonwood Mine (1984)

DATE: August 10-15, 1998

WORKERS: P. Collins, D. Collins

SLOPE: 13-15 deg.

EXPOSURE: Variable

AREA: .8 acres

ANIMAL USE/DISTURBANCE: Heavy deer sign.

EROSION: Negligible

COVER: Not sampled this year

DOMINANT PLANT SPECIES OBSERVED: (see also quantitative data)

Artemisia tridentata
Atriplex confertifolia
Cercocarpus montanus
Chrysothamnus nauseosus
Eriogonum corymbosum
Gutierrezia sarothrae
Purshia tridentata
Salix exigua
Sambucus caerulea

Aster chilensis
Cirsium sp.
Hedysarum boreale
Linum lewisii

Agropyron cristatum
Elymus cinereus
Elymus spicatus
Elymus junceus
Elymus lanceolatus
Elymus smithii
Poa secunda
Stipa hymenoides

NOTES: 1) We sampled only qualitative data in 1998.

PACIFICORP (ENERGY WEST)
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1998

SITE NAME: Reference Area

AREA: Cottonwood Mine Site

DATE: August 10-15, 1998

WORKERS: P. Collins, D. Collins

SLOPE: 36 deg.

EXPOSURE: NE

ANIMAL USE/DISTURBANCE: Minimal

EROSION: Negligible

COVER: Not sampled this year.

DOMINANT PLANT SPECIES OBSERVED:

Abies concolor
Amalanchier utahensis
Artemisia tridentata
Chrysothamnus depressus
Chrysothamnus nauseosus
Ephedra viridis
Eriogonum corymbosum
Gutierrezia sarothrae
Juniperus osteosperma
Pinus edulis
Pseudotsuga menziesii
Rosa woodsii
Symphoricarpos oreophilus

Hedysarum occidentale var. *canone*
Galium boreale
Leptodactylon watsonii

Elymus salinus
Stipa hymenoides

NOTES: 1) Sampled for qualitative data only in 1998.

PACIFICORP (ENERGY WEST)
 QUALITATIVE SAMPLING DATA SHEET AND
 QUANTITATIVE/QUALITATIVE NOTES
 1998

SITE NAME: 4th East Road

AREA: Cottonwood Mine (1986)

DATE: August 10-15, 1998

WORKERS: P. Collins, D. Collins

SLOPE: 3 - 5 degrees

EXPOSURE: N

AREA: .1 acre

ANIMAL USE/DISTURBANCE:

EROSION: Negligible

COVER: (see quantitative data).

DOMINANT PLANT SPECIES OBSERVED:

Aster chilensis
Descurainia pinnata
Medicago sativa

Elymus lanceolatus

WOODY SPECIES DENSITY:

no./Ac

	<u>1995</u>	<u>1996</u>	<u>1997</u>	<u>1998</u>
<i>Chrysothamnus nauseosus</i>		21.78		43.56
<i>Eriogonum corymbosum</i>		21.78	43.56	
<i>Gutierrezia sarothrae</i>	43.56			87.12
<i>Pinus edulis</i>		21.78	43.56	
<i>Symphoricarpos oreophilus</i>			43.56	43.56
TOTAL	<u>43.56</u>	<u>65.34</u>	<u>130.68</u>	<u>174.24</u>

ANNUAL PRODUCTIVITY:	LBS/Ac	
	<u>(1997)</u>	(1998)
Herbaceous	782.75	870.56
Woody	<u>0.00</u>	<u>0.00</u>
Total	782.75	870.56

- NOTES:
- 1) We sampled at regular at 20' intervals up entire road using a 200' tape.
 - 2) Sampled cover (n=10) and frequency (n=10) by ocular methods.
 - 3) Sampled density (n=8) with belt transects (5'X25').
 - 4) Sampled productivity [n=10(50)] by clipping, weighing and double sampling.
 - 5) I didn't sample production if number landed on trail.

ENERGY WEST-COTTONWOOD MINE

4th East Road (1986)

Acreage: .1

Slope: 3-5 deg

Exposure: N

Sample Date: 10-15 Aug 98 1.00 2.00 3.00 4.00 5.00 6.00

SHRUBS

FORBS

Medicago sativa 15.00 10.00 10.00 5.00 55.00 45.00

GRASSES

Elymus lanceolatus 0.00 50.00 35.00 65.00 0.00 20.00

Elymus smithii 40.00 0.00 0.00 0.00 15.00 0.00

COVER

Total Living Cover 55.00 60.00 45.00 70.00 70.00 65.00

Litter 35.00 30.00 5.00 20.00 20.00 20.00

Bareground 5.00 5.00 5.00 5.00 5.00 10.00

Rock 5.00 5.00 45.00 5.00 5.00 5.00

% COMPOSITION

Shrubs 0.00 0.00 0.00 0.00 0.00 0.00

Forbs 27.27 16.67 22.22 7.14 78.57 69.23

Grasses 72.73 83.33 77.78 92.86 21.43 30.77

ENERGY
4th East
Acreage:
Slope: 3-
Exposure:
Sample D

7.00	8.00	9.00	10.00	Mean	SDev	Freq	
-----							SHRUBS

20.00	20.00	25.00	50.00	25.50	17.10	100.00	FORBS Medicago
-------	-------	-------	-------	-------	-------	--------	-------------------

20.00	20.00	30.00	15.00	25.50	19.42	80.00	GRASSE Elymus la Elymus s
0.00	0.00	0.00	0.00	5.50	12.34	20.00	

40.00	40.00	55.00	65.00	56.50	10.97		COVER
40.00	35.00	20.00	20.00	24.50	9.86		Total Livi
10.00	15.00	10.00	5.00	7.50	3.35		Litter
10.00	10.00	15.00	10.00	11.50	11.63		Baregrou
							Rock

0.00	0.00	0.00	0.00	0.00	0.00		% COMP
50.00	50.00	45.45	76.92	44.35	24.18		Shrubs
50.00	50.00	54.55	23.08	55.65	24.18		Forbs
							Grasses

PACIFICORP (ENERGY WEST)
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1998

SITE NAME: Storage Yard Slope

AREA: Cottonwood Mine (1988 Reveg. Area)

DATE: August 10-15, 1998

WORKERS: P. Collins, D. Collins

SLOPE: 30 - 40 deg.

EXPOSURE: S & E

AREA: 1.3 acres

ANIMAL USE/DISTURBANCE:

EROSION: Mostly moderate.

COVER: (see quantitative data).

DOMINANT PLANT SPECIES OBSERVED: (see quantitative data)

Chrysothamnus nauseosus

Aster chilensis

Kochia scoparia

Penstemon palmeri

Agropyron cristatum

Bromus tectorum

Elymus cinereus

Elymus spicatus

Elymus lanceolatus

Sitanion hystrix

Stipa hymenoides

WOODY SPECIES DENSITY:	1997	1998
		(<u>no./ac</u>)
<i>Artemisia tridentata</i>		38.46
<i>Atriplex confertifolia</i>	39.89	
<i>Chrysothamnus nauseosus</i>	1396.14	1500.08
<i>Eriogonum corymbosum</i>	<u>159.56</u>	
Total	1595.59	<u>1538.54</u>

PRODUCTION:	1997	
		(<u>lbs/ac</u>)
Herbaceous	424.29	576.55
Woody	<u>461.76</u>	<u>413.22</u>
Total	886.05	989.78

- NOTES:
- 1) Sampled regularly around area half the locations were on the SE and half on the E exposures.
 - 2) Some sections on the E exposure had little or no cover and supported mostly weedy species, whereas, the south face has a fair representation of native species.
 - 3) Sampled cover (n=10) and frequency (n=10) by ocular methods.
 - 4) Sampled density by pt. quarter methods (n=10).
 - 5) Sampled productivity [n=10(50)] by clipping, weighing and double sampling.

ENERGY WEST-COTTONWOOD MINE

Storage Yard Slope

1988 Reveg. Interim

Acreage: 1.3

Slope: S & E

Exposure: 30 - 40 deg

Sample Date: 10-15 Aug 98

1.00 2.00 3.00 4.00 5.00 6.00

SHRUBS

Chrysothamnus nauseosus 5.00 10.00 0.00 0.00 35.00 30.00

FORBS

Aster chilensis 0.00 0.00 5.00 0.00 0.00 0.00

Kochia scoparia 5.00 0.00 0.00 0.00 0.00 0.00

Penstemon palmeri 0.00 0.00 0.00 0.00 5.00 0.00

GRASSES

Agropyron cristatum 0.00 0.00 55.00 0.00 0.00 0.00

Elymus cinereus 0.00 5.00 0.00 0.00 0.00 0.00

Elymus lanceolatus 5.00 10.00 0.00 0.00 0.00 0.00

Elymus smithii 0.00 15.00 0.00 20.00 0.00 0.00

Elymus spicatus 0.00 0.00 15.00 20.00 0.00 0.00

Hordeum jubatum 5.00 0.00 0.00 0.00 0.00 0.00

Stipa hymenoides 15.00 0.00 0.00 0.00 15.00 25.00

COVER

Total Living Cover 35.00 40.00 75.00 40.00 55.00 55.00

Litter 25.00 10.00 10.00 15.00 30.00 5.00

Bareground 10.00 20.00 5.00 30.00 5.00 20.00

Rock 30.00 30.00 10.00 15.00 10.00 20.00

% COMPOSITION

Shrubs 14.29 25.00 0.00 0.00 63.64 54.55

Forbs 14.29 0.00 6.67 0.00 9.09 0.00

Grasses 71.43 75.00 93.33 100.00 27.27 45.45

7.00	8.00	9.00	10.00	Mean	SDev	Freq	ENERGY Storage Y 1988 Rev Acreage: Slope: S Exposure: Sample D
35.00	45.00	5.00	25.00	19.00	15.94	80.00	SHRUBS Chrysotha
0.00	0.00	0.00	0.00	0.50	1.50	10.00	FORBS Aster chil
0.00	0.00	0.00	0.00	0.50	1.50	10.00	Kochia sc
15.00	15.00	10.00	20.00	6.50	7.43	50.00	Penstemo
5.00	0.00	0.00	0.00	6.00	16.40	20.00	GRASSE Agropyro
0.00	0.00	0.00	0.00	0.50	1.50	10.00	Elymus ci
5.00	0.00	30.00	5.00	5.50	8.79	50.00	Elymus la
0.00	0.00	0.00	0.00	3.50	7.09	20.00	Elymus s
0.00	0.00	0.00	0.00	3.50	7.09	20.00	Elymus s
0.00	0.00	0.00	0.00	0.50	1.50	10.00	Hordeum
0.00	0.00	0.00	0.00	5.50	8.79	30.00	Stipa hym
60.00	60.00	45.00	50.00	51.50	11.41		COVER Total Livi
5.00	10.00	10.00	10.00	13.00	7.81		Litter
10.00	15.00	20.00	15.00	15.00	7.42		Baregrou
25.00	15.00	25.00	25.00	20.50	7.23		Rock
58.33	75.00	11.11	50.00	35.19	26.69		% COMP Shrubs
25.00	25.00	22.22	40.00	14.23	12.85		Forbs
16.67	0.00	66.67	10.00	50.58	33.89		Grasses

PACIFICORP (ENERGY WEST)
 QUALITATIVE SAMPLING DATA SHEET AND
 QUANTITATIVE/QUALITATIVE NOTES
 1998

SITE NAME: Parking Lot Slope
 AREA: Cottonwood Mine
 DATE: August 10-15, 1998
 WORKERS: P. Collins, D. Collins
 SLOPE: 26 deg.
 EXPOSURE: E
 ANIMAL USE/DISTURBANCE:
 EROSION: Slight to moderate
 COVER: (see quantitative data)
 DOMINANT PLANT SPECIES OBSERVED:

Atriplex confertifolia
Chrysothamnus nauseosus
Eriogonum corymbosum

Aster chilensis
Kochia scoparia
Chenopodium album
Halogeton glomeratus
Polygonum aviculare
Grindelia squarrosa

Agropyron cristatum
Elymus cinereus
Elymus lanceolatus
Elymus smithii
Hordeum jubatum
Sitanion hystrix
Stipa hymenoides

WOODY SPECIES DENSITY:	1997	(no./ac)	1998
<i>Atriplex confertifolia</i>			99.57
<i>Chrysothamnus nauseosus</i>	597.40		547.61
<i>Eriogonum corymbosum</i>	<u>746.75</u>		<u>99.57</u>
Total	1344.15		746.74

PRODUCTION:	1997	(<u>lbs/ac</u>)	1998
Herbaceous	248.64		292.51
Woody	<u>369.64</u>		<u>37.83</u>
Total	618.28		330.34

NOTES:

- 1) Sampled cover (n=10) and frequency (n=10) by ocular methods.
- 3) Sampled density (n=7) with belt transects (5'X25').
- 4) Sampled productivity [n=5(25)] by clipping, weighing and double sampling every other sample location.

ENERGY WEST-COTTONWOOD MINE

Parking Lot Slope
1988 Reveg Interim

Acreage:

Slope: 26 deg

Exposure: E

Sample Date: 10-15 Aug 98

1.00 2.00 3.00 4.00 5.00 6.00

SHRUBS

<i>Chrysothamnus nauseosus</i>	10.00	0.00	0.00	10.00	0.00	0.00
<i>Eriogonum corymbosum</i>	0.00	3.00	0.00	0.00	0.00	0.00

FORBS

<i>Aster chilensis</i>	0.00	0.00	25.00	0.00	0.00	0.00
<i>Grindelia squarrosa</i>	0.00	0.00	0.00	0.00	0.00	0.00
<i>Halogeton glomeratus</i>	0.00	5.00	0.00	0.00	0.00	0.00
<i>Kochia scoparia</i>	5.00	15.00	0.00	0.00	5.00	25.00
<i>Polygonum aviculare</i>	0.00	0.00	0.00	0.00	0.00	0.00

GRASSES

<i>Elymus cinereus</i>	0.00	0.00	0.00	0.00	0.00	0.00
<i>Elymus lanceolatus</i>	0.00	2.00	0.00	0.00	0.00	0.00
<i>Elymus smithii</i>	0.00	0.00	0.00	0.00	35.00	0.00
<i>Hordeum jubatum</i>	0.00	0.00	0.00	0.00	10.00	0.00
<i>Stipa hymenoides</i>	0.00	0.00	0.00	0.00	0.00	0.00

COVER

Total Living Cover	15.00	25.00	25.00	10.00	50.00	25.00
Litter	5.00	5.00	10.00	5.00	25.00	15.00
Bareground	10.00	15.00	20.00	15.00	10.00	5.00
Rock	70.00	55.00	45.00	70.00	15.00	55.00

% COMPOSITION

Shrubs	66.67	12.00	0.00	100.00	0.00	0.00
Forbs	33.33	80.00	100.00	0.00	10.00	100.00
Grasses	0.00	8.00	0.00	0.00	90.00	0.00

ENERGY
 Parking L
 1988 Rev
 Acreage:
 Slope: 26
 Exposure:
 Sample D

7.00	8.00	9.00	10.00	Mean	SDev	Freq	
<hr/>							SHRUBS
0.00	0.00	5.00	0.00	2.50	4.03	30.00	<i>Chrysotha</i>
0.00	0.00	0.00	0.00	0.30	0.90	10.00	<i>Eriogonu</i>
 							FORBS
0.00	10.00	0.00	35.00	7.00	12.08	30.00	<i>Aster chil</i>
0.00	0.00	0.00	5.00	0.50	1.50	10.00	<i>Grindelia</i>
0.00	0.00	0.00	0.00	0.50	1.50	10.00	<i>Halogeton</i>
0.00	0.00	0.00	0.00	5.00	8.06	40.00	<i>Kochia sc</i>
10.00	0.00	0.00	0.00	1.00	3.00	10.00	<i>Polygonu</i>
 							GRASSE
0.00	15.00	0.00	0.00	1.50	4.50	10.00	<i>Elymus ci</i>
0.00	0.00	0.00	0.00	0.20	0.60	10.00	<i>Elymus la</i>
0.00	0.00	0.00	0.00	3.50	10.50	10.00	<i>Elymus s</i>
0.00	0.00	0.00	0.00	1.00	3.00	10.00	<i>Hordeum</i>
0.00	0.00	35.00	0.00	3.50	10.50	10.00	<i>Stipa hym</i>
<hr/>							COVER
10.00	25.00	40.00	40.00	26.50	12.66		Total Livi
5.00	5.00	5.00	5.00	8.50	6.34		Litter
5.00	5.00	20.00	5.00	11.00	5.83		Baregrou
80.00	65.00	35.00	50.00	54.00	18.14		Rock
<hr/>							% COMP
0.00	0.00	12.50	0.00	19.12	33.30		Shrubs
100.00	40.00	0.00	100.00	56.33	41.81		Forbs
0.00	60.00	87.50	0.00	24.55	36.60		Grasses

PACIFICORP (ENERGY WEST)
 QUALITATIVE SAMPLING DATA SHEET AND
 QUANTITATIVE/QUALITATIVE NOTES
 1998

SITE NAME: Road/Silo Pad Slope
 AREA: Cottonwood Mine (1988 Reveg. Area)
 DATE: August 10-15, 1998
 WORKERS: P. Collins, D. Collins
 SLOPE: 35 deg.
 EXPOSURE: SE
 ACREAGE: 1.4 acre
 ANIMAL USE/DISTURBANCE: Negligible
 EROSION: Moderate (see notes)
 COVER: (see quantitative data).

DOMINANT PLANT SPECIES OBSERVED:

Chrysothamnus nauseosus
Eriogonum corymbosum

Aster glaucodes
Penstemon palmeri
Halogeton glomeratus

Elymus cinereus
Elymus hispidus
Elymus lanceolatus
Elymus spicatus
Stipa hymenoides

WOODY SPECIES DENSITY:	1997	(no./ac)	1998
<i>Atriplex confertifolia</i>	359.06		359.06
<i>Chrysothamnus nauseosus</i>	1997.21		1795.29
<i>Eriogonum corymbosum</i>	<u>1331.47</u>		<u>239.37</u>
Total	3328.68		2393.72

PRODUCTION:	1997	(lbs/ac)	1998
Herbaceous	472.04		557.87
Woody	<u>392.63</u>		<u>226.30</u>
Total	864.67		804.17

page 2

Site: Road/Silo Pad Slope

- NOTES:
- 1) We took five samples below the test plot by conventional methods and 5 on the steep slope by LDS (long distance scan) methods (cover n=10).
 - 2) For density we used the point quarter method (n=5).
 - 3) For production we "double" sampled [n=5(25)].
 - 4) Area was active with mine activity and constantly under change. The plant growth is unstable.

ENERGY WEST-COTTONWOOD MINE

Road/Silo Pad Slope

1988 Reveg Interim

Acreage: 1.4

Slope: 35 deg

Exposure: SE

Sample Date: 10-15 Aug 98

1.00 2.00 3.00 4.00 5.00 6.00

SHRUBS

<i>Atriplex confertifolia</i>	0.00	0.00	0.00	0.00	0.00	0.00
<i>Chrysothamnus nauseosus</i>	0.00	10.00	20.00	40.00	0.00	20.00
<i>Eriogonum corymbosum</i>	0.00	0.00	0.00	15.00	5.00	0.00

FORBS

<i>Aster chilensis</i>	30.00	60.00	30.00	0.00	50.00	0.00
<i>Halogeton glomeratus</i>	0.00	0.00	0.00	0.00	0.00	0.00
<i>Penstemon palmeri</i>	5.00	0.00	0.00	0.00	0.00	0.00

GRASSES

<i>Elymus cinereus</i>	0.00	0.00	0.00	0.00	0.00	0.00
<i>Elymus hispidus</i>	0.00	0.00	0.00	0.00	10.00	0.00
<i>Elymus lanceolatus</i>	10.00	0.00	0.00	15.00	0.00	0.00

COVER

Total Living Cover	45.00	70.00	50.00	70.00	65.00	20.00
Litter	5.00	10.00	10.00	10.00	5.00	10.00
Bareground	10.00	10.00	15.00	10.00	10.00	10.00
Rock	40.00	10.00	25.00	10.00	20.00	60.00

% COMPOSITION

Shrubs	0.00	14.29	40.00	78.57	7.69	100.00
Forbs	77.78	85.71	60.00	0.00	76.92	0.00
Grasses	22.22	0.00	0.00	21.43	15.38	0.00

ENERGY
Road/Silo
1988 Rev
Acreage:
Slope: 35
Exposure:
Sample D

7.00	8.00	9.00	10.00	Mean	SDev	Freq	
<hr/>							SHRUBS
15.00	0.00	0.00	10.00	2.50	5.12	20.00	<i>Atriplex c</i>
0.00	0.00	0.00	0.00	9.00	13.00	40.00	<i>Chrysotha</i>
0.00	0.00	0.00	0.00	2.00	4.58	20.00	<i>Eriogonu</i>
 							FORBS
0.00	5.00	0.00	0.00	17.50	22.05	50.00	<i>Aster chil</i>
0.00	20.00	0.00	0.00	2.00	6.00	10.00	<i>Halogeton</i>
0.00	0.00	0.00	0.00	0.50	1.50	10.00	<i>Penstemo</i>
 							GRASSE
0.00	0.00	10.00	0.00	1.00	3.00	10.00	<i>Elymus ci</i>
0.00	0.00	0.00	0.00	1.00	3.00	10.00	<i>Elymus hi</i>
0.00	0.00	0.00	0.00	2.50	5.12	20.00	<i>Elymus la</i>
 							COVER
15.00	25.00	10.00	10.00	38.00	23.58		Total Livi
5.00	65.00	10.00	10.00	14.00	17.15		Litter
25.00	5.00	10.00	10.00	11.50	5.02		Baregrou
55.00	5.00	70.00	70.00	36.50	24.40		Rock
 							% COMP
100.00	0.00	0.00	100.00	44.05	43.16		Shrubs
0.00	100.00	0.00	0.00	40.04	41.09		Forbs
0.00	0.00	100.00	0.00	15.90	29.43		Grasses

PACIFICORP (ENERGY WEST)
 QUALITATIVE SAMPLING DATA SHEET AND
 QUANTITATIVE/QUALITATIVE NOTES
 1998

SITE NAME: Tipple Area Slope

AREA: Cottonwood Mine (1988 Reveg. Area)

DATE: August 10-15, 1998

WORKERS: P. Collins, D. Collins

SLOPE: 35 deg.

EXPOSURE: Variable

AREA: .1 acre

ANIMAL USE/DISTURBANCE: none

EROSION: Moderate erosion was beginning in the sparsely vegetated areas.

COVER: (see quantitative data).

DOMINANT PLANT SPECIES OBSERVED:

Atriplex confertifolia
Atriplex gardneri
Eriogonum corymbosum
Chrysothamnus nauseosus

Aster glaucodes
Halogeton glomeratus
Kochia scoparia
Salsola pestifer

Elymus lanceolatus
Stipa hymenoides

WOODY SPECIES DENSITY:	1997	1998
	(no./ac)	
<i>Atriplex confertifolia</i>	535.92	219.13
<i>Chrysothamnus nauseosus</i>	1224.96	913.05
<i>Eriogonum corymbosum</i>	<u>1307.53</u>	<u>358.70</u>
Total	3062.41	1460.88

PRODUCTION:	1997	(<u>lbs/ac</u>)	1998
Herbaceous	113.50		399.05
Woody	<u>280.12</u>		<u>437.35</u>
Total	393.63		836.40

NOTES:

- 1) Sampled cover [n=10 (7 on N side of road and 3 on S side)] and frequency (n=10) by ocular methods.
- 2) Sampled density (n=10) with pt. quarter methods.
- 3) Sampled productivity [n=5(25); 4 on N side and 1 on S side] by clipping, weighing and double sampling.
- 4) Area was still active constantly changing and active and therefore, unstable for plant growth. It's a difficult place for desirable spp. to become established.

ENERGY WEST-COTTONWOOD MINE

Tipple Area Slope

1988 Reveg Interim

Acreage: .1

Slope: 35 deg

Exposure: variable

Sample Date: 10-15 Aug 98 1.00 2.00 3.00 4.00 5.00 6.00

SHRUBS

Atriplex confertifolia 0.00 0.00 10.00 0.00 30.00 0.00

Chrysothamnus nauseosus 5.00 5.00 0.00 15.00 0.00 15.00

Eriogonum corymbosum 0.00 0.00 0.00 0.00 0.00 15.00

FORBS

Aster chilensis 25.00 0.00 0.00 0.00 0.00 0.00

GRASSES

Elymus lanceolatus 0.00 5.00 0.00 0.00 0.00 0.00

Stipa hymenoides 0.00 15.00 25.00 0.00 0.00 10.00

COVER

Total Living Cover 30.00 25.00 35.00 15.00 30.00 40.00

Litter 20.00 10.00 20.00 15.00 10.00 10.00

Bareground 30.00 30.00 20.00 25.00 20.00 10.00

Rock 20.00 35.00 25.00 45.00 40.00 40.00

% COMPOSITION

Shrubs 16.67 20.00 28.57 100.00 100.00 75.00

Forbs 83.33 0.00 0.00 0.00 0.00 0.00

Grasses 0.00 80.00 71.43 0.00 0.00 25.00

ENERGY
 Tipple Ar
 1988 Rev
 Acreage:
 Slope: 35
 Exposure:
 Sample D

7.00	8.00	9.00	10.00	Mean	SDev	Freq	
<hr/>							SHRUBS
0.00	0.00	5.00	0.00	4.50	9.07	30.00	<i>Atriplex c</i>
0.00	15.00	10.00	0.00	6.50	6.34	60.00	<i>Chrysotha</i>
0.00	10.00	0.00	0.00	2.50	5.12	20.00	<i>Eriogonu</i>
 							FORBS
10.00	0.00	0.00	15.00	5.00	8.37	30.00	<i>Aster chil</i>
 							GRASSE
0.00	0.00	0.00	0.00	0.50	1.50	10.00	<i>Elymus la</i>
0.00	0.00	0.00	10.00	6.00	8.31	40.00	<i>Stipa hym</i>
 							COVER
10.00	25.00	15.00	25.00	25.00	8.94		Total Livi
5.00	10.00	15.00	20.00	13.50	5.02		Litter
10.00	25.00	10.00	10.00	19.00	8.00		Baregrou
75.00	40.00	60.00	45.00	42.50	15.04		Rock
 							% COMP
0.00	100.00	100.00	0.00	54.02	42.35		Shrubs
100.00	0.00	0.00	60.00	24.33	38.24		Forbs
0.00	0.00	0.00	40.00	21.64	30.07		Grasses

PACIFICORP (ENERGY WEST)
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1998

SITE NAME: Sediment Pond Banks

AREA: Cottonwood Mine (1988 Reveg. Area)

DATE: August 10-15, 1998

WORKERS: P. Collins, D. Collins

SLOPE: 35 deg.

EXPOSURE: Variable

AREA: .9 acre

ANIMAL USE/DISTURBANCE:

EROSION: Slight

COVER: (see quantitative data)

DOMINANT PLANT SPECIES OBSERVED: (see also quantitative data)

Atriplex canescens
Chrysothamnus nauseosus

Aster chilensis
Convolvulus arvensis
Grindelia squarrosa
Halogeton glomeratus
Kochia scoparia
Melilotus officinalis
Salsola pestifer

Agropyron cristatum
Bromus inermis
Elymus cinereus
Elymus lanceolatus
Elymus spicatus
Sitanion hystrix
Stipa hymenoides

WOODY SPECIES DENSITY:	1997	(no./ac)	1998
<i>Chrysothamnus nauseosus</i>	487.87		348.48
<i>Eriogonum corymbosum</i>	<u>92.93</u>		<u>348.48</u>
Total	580.80		
PRODUCTION:	1997	(lbs/ac)	1998
Herbaceous	442.39		791.65
Woody	<u>29.80</u>		<u>77.19</u>
Total	472.19		868.85

- NOTES:
- 1) We sampled on lower pond where we tried to place the random numbers on both bare and vegetated areas.
 - 2) Sampled cover (n=15) and frequency (n=15) by ocular methods.
 - 3) Sampled density (n=16) with belt transects (5'X25').
 - 4) Sampled productivity [n=15(75)] by clipping, weighing and double sampling.
 - 5) Production did not include weed species. We sampled all the production on the lower pond.
 - 6) Patchy vegetation growth patterns with some desirable and some weedy species. This is due to erosion control and fluctuating water levels in pond.
 - 7) Regular maintenance of pond disturbs vegetation.
 - 8) There was lots of material added around banks that disturbed the vegetation.
 - 9) There was an area that had a fair amount of willows becoming established.
 - 10) The cover looked good on ponds that had not been disturbed.

ENERGY WEST-COTTONWOOD MINE

Sediment Pond Banks

1988 Reveg Interim

Acreage: .9

Slope: 35 deg

Exposure: variable

Sample Date: 10-15 Aug 98

1.00 2.00 3.00 4.00 5.00 6.00

SHRUBS

<i>Chrysothamnus nauseosus</i>	15.00	5.00	0.00	0.00	10.00	0.00
<i>Eriogonum corymbosum</i>	0.00	10.00	0.00	0.00	0.00	0.00

FORBS

<i>Aster chilensis</i>	30.00	15.00	5.00	0.00	15.00	30.00
<i>Convolvulus arvensis</i>	0.00	0.00	0.00	15.00	0.00	0.00
<i>Grindelia squarrosa</i>	0.00	5.00	5.00	0.00	0.00	0.00
<i>Halogeton glomeratus</i>	0.00	0.00	0.00	0.00	0.00	0.00
<i>Helianthus annuus</i>	0.00	0.00	0.00	0.00	0.00	0.00
<i>Kochia scoparia</i>	0.00	0.00	0.00	0.00	0.00	0.00
<i>Melilotus officinalis</i>	0.00	0.00	0.00	0.00	0.00	0.00

GRASSES

<i>Elymus cinereus</i>	10.00	0.00	0.00	30.00	0.00	0.00
<i>Elymus lanceolatus</i>	0.00	0.00	0.00	0.00	0.00	20.00
<i>Elymus smithii</i>	0.00	0.00	40.00	0.00	0.00	0.00
<i>Elymus salinus</i>	15.00	0.00	0.00	0.00	20.00	0.00
<i>Stipa hymenoides</i>	0.00	0.00	0.00	0.00	15.00	10.00

COVER

Total Living Cover	70.00	35.00	50.00	45.00	60.00	60.00
Litter	10.00	10.00	10.00	10.00	10.00	10.00
Bareground	15.00	30.00	15.00	20.00	5.00	20.00
Rock	5.00	25.00	25.00	25.00	25.00	10.00

% COMPOSITION

Shrubs	21.43	0.00	0.00	0.00	16.67	0.00
Forbs	42.86	0.00	20.00	33.33	25.00	50.00
Grasses	35.71	0.00	80.00	66.67	58.33	50.00

7.00	8.00	9.00	10.00	11.00	12.00	13.00	14.00	15.00
0.00	0.00	20.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25.00	45.00	45.00	8.00	15.00	0.00	0.00	5.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	7.00	5.00	2.00	2.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	1.00	3.00	0.00	5.00
0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	5.00	1.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00
0.00	10.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
35.00	10.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60.00	65.00	65.00	15.00	25.00	5.00	5.00	10.00	5.00
10.00	10.00	10.00	10.00	5.00	5.00	5.00	5.00	20.00
20.00	15.00	10.00	65.00	45.00	65.00	65.00	55.00	50.00
10.00	10.00	15.00	10.00	25.00	25.00	25.00	30.00	25.00
0.00	0.00	30.77	0.00	0.00	0.00	0.00	0.00	0.00
41.67	69.23	69.23	100.00	100.00	100.00	100.00	50.00	100.00
58.33	30.77	0.00	0.00	0.00	0.00	0.00	50.00	0.00

ENERGY WEST-COTTONWOOD MINE
 Sediment Pond Banks
 1988 Reveg Interim
 Acreage: .9
 Slope: 35 deg
 Exposure: variable
 Sample Date: 10-15 Aug 98

Mean	SDev	Freq	
<hr/>			
3.33	6.24	26.67	SHRUBS
0.67	2.49	6.67	<i>Chrysothamnus nauseosus</i>
			<i>Eriogonum corymbosum</i>
15.87	15.25	73.33	FORBS
1.00	3.74	6.67	<i>Aster chilensis</i>
0.67	1.70	13.33	<i>Convolvulus arvensis</i>
1.07	2.08	26.67	<i>Grindelia squarrosa</i>
0.60	1.40	20.00	<i>Halogeton glomeratus</i>
0.07	0.25	6.67	<i>Helianthus annuus</i>
0.40	1.25	13.33	<i>Kochia scoparia</i>
			<i>Melilotus officinalis</i>
3.00	7.70	20.00	GRASSES
2.00	5.42	13.33	<i>Elymus cinereus</i>
5.67	12.76	20.00	<i>Elymus lanceolatus</i>
2.33	6.02	13.33	<i>Elymus smithii</i>
1.67	4.35	13.33	<i>Elymus salinus</i>
			<i>Stipa hymenoides</i>
<hr/>			
38.33	24.34		COVER
9.33	3.59		Total Living Cover
33.00	21.28		Litter
19.33	7.93		Bareground
			Rock
<hr/>			
4.59	9.55		% COMPOSITION
60.09	32.80		Shrubs
28.65	28.93		Forbs
			Grasses
<hr/>			

PACIFICORP (ENERGY WEST)
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1998

SITE NAME: Ninth East Road Breakout

AREA: Cottonwood Mine (1988 Reveg. Area)

DATE: August 10-15, 1998

WORKERS: P. Collins, D. Collins

SLOPE: Variable

EXPOSURE: Variable

ANIMAL USE/DISTURBANCE:

EROSION: Negligible, controlled well by plants

COVER: (qualitative data only).

DOMINANT PLANT SPECIES OBSERVED:

Chrysothamnus nauseosus
Purshia tridentata

Aster chilensis
Hedysarum boreale
Melilotus officinalis

Cirsium sp.

Bromus inermis
Dactylis glomeratus
Elymus lanceolatus
Elymus spicatus
Elymus smithii
Agropyron cristatum
Stipa hymenoides

- NOTES:
- 1) We sampled for qualitative data
 - 2) Very few woody species.
 - 3) Area looked in good condition.
 - 4) Straw bales were in bad shape.
 - 5) The site looked better than ever when compared to previous years.
 - 6) There was lots of forb and grass cover.

PACIFICORP (ENERGY WEST)
 QUALITATIVE SAMPLING DATA SHEET AND
 QUANTITATIVE/QUALITATIVE NOTES
 1998

SITE NAME: Test Plots '88

AREA: Cottonwood Mine

DATE: August 10-15, 1998

WORKERS: P. Collins, D. Collins

SLOPE: 35 deg.

EXPOSURE: E (S)

ANIMAL USE/DISTURBANCE:

EROSION: Slight to moderate in some areas

COVER: Similar to what was reported in 1994-97, the upper plots (T1 - T4) seemed to have more weedy spp. in the upper 1/2 of the plot. This could be over-spill from road salt above it. The plots looked worse this year (more weeds and bare ground).

NOTES: 1) See reference drawing below.

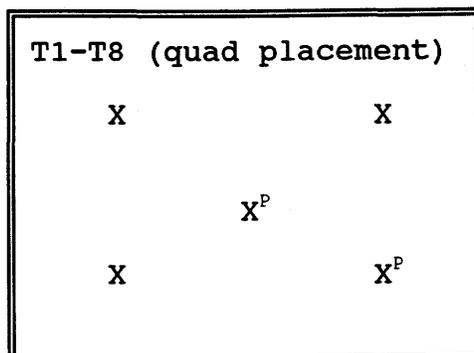
ROAD

T1* Hydro Mulch	T2* Mulch Blanket	T3* Hay & Netting	T4* No Mulch
T5** Hydro Mulch	T6** Mulch Blanket	T7** Hay & Netting	T8** No Mulch

* Non-irrigated plots

** Irrigated plots

*** Plots are 20' x 20' with 5' between



^P Production sample locations in previous years.

PLANT SPECIES PLANTED:

Amalanchier alnifolia
Atriplex canescens
Chrysothamnus nauseosus
Ephedra viridis
Pseudotsuga menziesii

Aster glaucodes
Linum lewisii
Melilotus officinalis
Sphaeralcea coccinea

Agropyron dasystachyum
Agropyron intermedium
Elymus smithii
Elymus spicatus
Oryzopsis hymenoides
Stipa comata

PLANT SPECIES OBSERVED:

Chrysothamnus nauseosus
Eriogonum corymbosum
Atriplex confertifolia

Aster chilensis
Aster glaucodes
Chenopodium album
Grindelia squarrosa
Halogeton glomeratus
Kochia scoparia
Melilotus officinalis
Eriogonum sp.

Elymus cinereus
Elymus spicatus
Elymus lanceolatus

WOODY SPECIES DENSITY:

	1997	1998
T1	(no./ac)	
<i>Chrysothamnus nauseosus</i>	2613.60	3652.34
<i>Atriplex confertifolia</i>	108.90	260.88
<i>Eriogonum corymbosum</i>	544.50	782.65
<i>Ephedra viridis</i>	<u>108.90</u>	<u>521.76</u>
Total	3375.90	5217.63
T2	(no./ac)	
<i>Chrysothamnus nauseosus</i>	544.50	1163.98
<i>Atriplex confertifolia</i>	326.70	349.20
<i>Eriogonum corymbosum</i>	326.70	814.79
<i>Ephedra viridis</i>	<u>0.00</u>	<u>0.00</u>
Total	1197.90	2327.97
T3	(no./ac)	
<i>Chrysothamnus nauseosus</i>	544.50	744.09
<i>Atriplex confertifolia</i>	217.80	1116.13
<i>Eriogonum corymbosum</i>	0.00	0.00
<i>Ephedra viridis</i>	<u>0.00</u>	<u>0.00</u>
Total	762.30	1860.22
T4	(no./ac)	
<i>Chrysothamnus nauseosus</i>	217.80	176.20
<i>Atriplex confertifolia</i>	108.90	616.70
<i>Eriogonum corymbosum</i>	108.90	88.10
<i>Ephedra viridis</i>	<u>0.00</u>	<u>0.00</u>
Total	435.60	880.00

	1997	1998
T5	(no./ac)	
<i>Chrysothamnus nauseosus</i>	2178.00	2954.73
<i>Atriplex confertifolia</i>	217.80	0.00
<i>Eriogonum corymbosum</i>	326.70	6894.36
<i>Ephedra viridis</i>	<u>0.00</u>	<u>0.00</u>
Total	2722.50	9849.09
T6	(no./ac)	
<i>Chrysothamnus nauseosus</i>	2069.10	1508.93
<i>Atriplex confertifolia</i>	0.00	0.00
<i>Eriogonum corymbosum</i>	217.80	167.66
<i>Ephedra viridis</i>	<u>0.00</u>	<u>0.00</u>
Total	2287.90	1676.59
T7	(no./ac)	
<i>Chrysothamnus nauseosus</i>	653.40	11490.46
<i>Atriplex confertifolia</i>	326.70	3830.15
<i>Eriogonum corymbosum</i>	0.00	0.00
<i>Ephedra viridis</i>	<u>0.00</u>	<u>0.00</u>
Total	980.10	15320.61
T8	(no./ac)	
<i>Chrysothamnus nauseosus</i>	1197.90	2107.97
<i>Atriplex confertifolia</i>	435.60	383.27
<i>Eriogonum corymbosum</i>	871.20	1341.43
<i>Ephedra viridis</i>	<u>0.00</u>	<u>0.00</u>
Total	2504.70	3842.67
T1		
PRODUCTION:	1997	1998
	(lbs/ac)	
Herbaceous	1016.37	297.15
Woody	<u>126.71</u>	<u>49.97</u>
Total	1143.08	347.12

T2

PRODUCTION:	1997	1998 (<u>lbs/ac</u>)
Herbaceous	563.78	627.67
Woody	<u>616.96</u>	<u>427.78</u>
Total	1180.73	1055.45

T3

PRODUCTION:	1997	1998 (<u>lbs/ac</u>)
Herbaceous	472.22	0.00
Woody	<u>455.36</u>	<u>37.48</u>
Total	927.58	37.48

T4

PRODUCTION:	1997	1998 (<u>lbs/ac</u>)
Herbaceous	300.98	110.83
Woody	<u>397.44</u>	<u>43.28</u>
Total	698.43	154.11

T5

PRODUCTION:	1997	1998 (<u>lbs/ac</u>)
Herbaceous	703.16	218.62
Woody	<u>203.45</u>	<u>253.42</u>
Total	906.61	472.04

T6

PRODUCTION:	1997	1998 (<u>lbs/ac</u>)
Herbaceous	864.67	736.89
Woody	<u>73.62</u>	<u>0.00</u>
Total	938.29	736.89

T7

PRODUCTION:	1997	1998 (<u>lbs/ac</u>)
Herbaceous	1807.87	585.37
Woody	<u>165.97</u>	<u>0.00</u>
Total	1973.84	585.37

T8

PRODUCTION:	1997	1998 (<u>lbs/ac</u>)
Herbaceous	1027.97	917.50
Woody	<u>0.00</u>	<u>54.79</u>
Total	1027.97	972.29

- METHODS:
- 1) Top half of test plot (T1-T4) was almost void of desirable species probably due to road salt.
 - 2) Seemed like there were fewer grasses this year.
 - 3) Many plots had fewer shrubs also.
 - 4) Aster chilensis seems to be out-competing everything else.
 - 5) For cover we sampled in the locations shown on the diagram to stay away from plot lines. Therefore, our sample size was (n=5/subplot and n=40/plot).
 - 6) For density we used pt. quarter method this year.
 - 7) Sampled productivity [n=2(10)/plot; total=16(80)] by clipping, weighing and double sampling.
 - 8) **The subplots really should be restaked to separate them for sampling more easily.**
 - 9) Plots seemed in worse condition this year.

ENERGY WEST-COTTONWOOD MINE

TEST PLOTS '88

Test Plot #1 (T1)

Slope: 35 deg

Exposure: E(S)

Sample Date: 10-15 Aug 98

	1.00	2.00	3.00	4.00	5.00	Mean
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SHRUBS

<i>Atriplex confertifolia</i>	0.00	0.00	0.00	5.00	0.00	1.00
<i>Chrysothamnus nauseosus</i>	5.00	0.00	0.00	15.00	5.00	5.00
<i>Eriogonum corymbosum</i>	0.00	0.00	0.00	20.00	10.00	6.00

FORBS

<i>Aster chilensis</i>	0.00	45.00	10.00	0.00	25.00	16.00
<i>Halogeton glomeratus</i>	15.00	0.00	10.00	0.00	0.00	5.00
<i>Kochia scoparia</i>	5.00	0.00	0.00	0.00	0.00	1.00

GRASSES

<i>Elymus cinereus</i>	0.00	5.00	0.00	5.00	0.00	2.00
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COVER

Total Living Cover	25.00	50.00	20.00	45.00	40.00	36.00
Litter	10.00	25.00	5.00	10.00	10.00	12.00
Bareground	50.00	20.00	50.00	15.00	30.00	33.00
Rock	15.00	5.00	25.00	30.00	20.00	19.00

% COMPOSITION

Shrubs	20.00	0.00	0.00	88.89	37.50	29.28
Forbs	80.00	90.00	100.00	0.00	62.50	66.50
Grasses	0.00	10.00	0.00	11.11	0.00	4.22

ENERGY WEST-COTTONWOOD MINE

TEST PLOTS '88

Test Plot #1 (T1)

Slope: 35 deg

Exposure: E(S)

Sample Date: 10-15 Aug 98

SDev	Freq	

		SHRUBS
2.00	20.00	<i>Atriplex confertifolia</i>
5.48	60.00	<i>Chrysothamnus nauseosus</i>
8.00	40.00	<i>Eriogonum corymbosum</i>
		FORBS
17.15	60.00	<i>Aster chilensis</i>
6.32	40.00	<i>Halogeton glomeratus</i>
2.00	20.00	<i>Kochia scoparia</i>
		GRASSES
2.45	40.00	<i>Elymus cinereus</i>

		COVER
11.58		Total Living Cover
6.78		Litter
14.70		Bareground
8.60		Rock

		% COMPOSITION
32.93		Shrubs
35.48		Forbs
5.18		Grasses

ENERGY WEST-COTTONWOOD MINE

TEST PLOTS '88

Test Plot #2 (T2)

Slope: 35 deg

Exposure: E(S)

Sample Date: 10-15 Aug 98

	1.00	2.00	3.00	4.00	5.00	Mean
--	------	------	------	------	------	------

SHRUBS

<i>Chrysothamnus nauseosus</i>	0.00	10.00	0.00	20.00	10.00	8.00
<i>Eriogonum corymbosum</i>	0.00	0.00	0.00	0.00	15.00	3.00

FORBS

<i>Aster chilensis</i>	5.00	0.00	0.00	0.00	40.00	9.00
<i>Halogeton glomeratus</i>	5.00	0.00	10.00	45.00	0.00	12.00

GRASSES

<i>Elymus lanceolatus</i>	0.00	15.00	0.00	0.00	0.00	3.00
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COVER

Total Living Cover	10.00	25.00	10.00	65.00	65.00	35.00
Litter	10.00	10.00	10.00	10.00	10.00	10.00
Bareground	60.00	45.00	65.00	15.00	10.00	39.00
Rock	20.00	20.00	15.00	10.00	15.00	16.00

% COMPOSITION

Shrubs	0.00	40.00	0.00	30.77	38.46	21.85
Forbs	100.00	0.00	100.00	69.23	61.54	66.15
Grasses	0.00	60.00	0.00	0.00	0.00	12.00

ENERGY WEST-COTTONWOOD MINE

TEST PLOTS '88

Test Plot #2 (T2)

Slope: 35 deg

Exposure: E(S)

Sample Date: 10-15 Aug 98

SDev	Freq	

		SHRUBS
7.48	60.00	<i>Chrysothamnus nauseosus</i>
6.00	20.00	<i>Eriogonum corymbosum</i>
		FORBS
15.62	40.00	<i>Aster chilensis</i>
16.91	60.00	<i>Halogeton glomeratus</i>
		GRASSES
6.00	20.00	<i>Elymus lanceolatus</i>

		COVER
25.10		Total Living Cover
0.00		Litter
22.67		Bareground
3.74		Rock

		% COMPOSITION
18.11		Shrubs
36.60		Forbs
24.00		Grasses

ENERGY WEST-COTTONWOOD MINE

TEST PLOTS '88

Test Plot #3 (T3)

Slope: 35 deg

Exposure: E(S)

Sample Date: 10-15 Aug 98

	1.00	2.00	3.00	4.00	5.00	Mean
--	------	------	------	------	------	------

SHRUBS

<i>Atriplex confertifolia</i>	5.00	5.00	0.00	0.00	0.00	2.00
<i>Chrysothamnus nauseosus</i>	0.00	0.00	0.00	0.00	40.00	8.00

FORBS

<i>Aster chilensis</i>	0.00	0.00	0.00	25.00	10.00	7.00
<i>Halogeton glomeratus</i>	10.00	10.00	10.00	0.00	0.00	6.00
<i>Kochia scoparia</i>	10.00	5.00	10.00	0.00	5.00	6.00

GRASSES

COVER

Total Living Cover	25.00	20.00	20.00	25.00	55.00	29.00
Litter	10.00	10.00	20.00	60.00	10.00	22.00
Bareground	40.00	25.00	40.00	10.00	15.00	26.00
Rock	25.00	45.00	20.00	5.00	20.00	23.00

% COMPOSITION

Shrubs	20.00	25.00	0.00	0.00	72.73	23.55
Forbs	80.00	75.00	100.00	100.00	27.27	76.45
Grasses	0.00	0.00	0.00	0.00	0.00	0.00

ENERGY WEST-COTTONWOOD MINE

TEST PLOTS '88

Test Plot #3 (T3)

Slope: 35 deg

Exposure: E(S)

Sample Date: 10-15 Aug 98

SDev	Freq	
2.45	40.00	SHRUBS
16.00	20.00	<i>Atriplex confertifolia</i>
		<i>Chrysothamnus nauseosus</i>

SDev	Freq	
9.80	40.00	FORBS
4.90	30.00	<i>Aster chilensis</i>
3.74	80.00	<i>Halogeton glomeratus</i>
		<i>Kochia scoparia</i>

GRASSES

SDev	Freq	
13.19		COVER
19.39		Total Living Cover
12.41		Litter
12.88		Bareground
		Rock
26.62		% COMPOSITION
26.62		Shrubs
0.00		Forbs
		Grasses

ENERGY WEST-COTTONWOOD MINE

TEST PLOTS'88

Test Plot #4 (T4)

Slope: 35 deg

Exposure: E(S)

Sample Date: 10-15 Aug 98

	1.00	2.00	3.00	4.00	5.00	Mean
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SHRUBS

<i>Atriplex confertifolia</i>	5.00	0.00	10.00	0.00	0.00	3.00
<i>Chrysothamnus nauseosus</i>	0.00	0.00	45.00	0.00	5.00	10.00
<i>Eriogonum corymbosum</i>	0.00	0.00	0.00	0.00	5.00	1.00

FORBS

<i>Aster chilensis</i>	0.00	20.00	10.00	0.00	10.00	8.00
<i>Halogeton glomeratus</i>	0.00	0.00	0.00	5.00	0.00	1.00

GRASSES

COVER

Total Living Cover	5.00	20.00	65.00	5.00	20.00	23.00
Litter	10.00	25.00	15.00	5.00	20.00	15.00
Bareground	55.00	45.00	5.00	60.00	40.00	41.00
Rock	30.00	10.00	15.00	30.00	20.00	21.00

% COMPOSITION

Shrubs	100.00	0.00	84.62	0.00	50.00	46.92
Forbs	0.00	100.00	15.38	100.00	50.00	53.08
Grasses	0.00	0.00	0.00	0.00	0.00	0.00

ENERGY WEST-COTTONWOOD MINE

TEST PLOTS'88

Test Plot #4 (T4)

Slope: 35 deg

Exposure: E(S)

Sample Date: 10-15 Aug 98

SDev	Freq	

		SHRUBS
4.00	40.00	<i>Atriplex confertifolia</i>
17.61	40.00	<i>Chrysothamnus nauseosus</i>
2.00	20.00	<i>Eriogonum corymbosum</i>
		FORBS
7.48	60.00	<i>Aster chilensis</i>
2.00	20.00	<i>Halogeton glomeratus</i>

GRASSES

		COVER
22.05		Total Living Cover
7.07		Litter
19.34		Bareground
8.00		Rock

		% COMPOSITION
41.60		Shrubs
41.60		Forbs
0.00		Grasses

ENERGY WEST-COTTONWOOD MINE

TEST PLOTS '88

Test Plot #5 (T5)

Slope: 35 deg

Exposure: E(S)

Sample Date: 10-15 Aug 98

	1.00	2.00	3.00	4.00	5.00	Mean
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SHRUBS

<i>Chrysothamnus nauseosus</i>	15.00	0.00	20.00	0.00	5.00	8.00
<i>Erigonum corymbosum</i>	0.00	5.00	15.00	25.00	10.00	11.00

FORBS

<i>Aster chilensis</i>	20.00	30.00	5.00	30.00	60.00	29.00
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GRASSES

<i>Elymus lanceolatus</i>	0.00	5.00	0.00	0.00	0.00	1.00
<i>Elymus spicatus</i>	0.00	5.00	0.00	0.00	0.00	1.00
<i>Hordeum jubatum</i>	0.00	0.00	5.00	0.00	0.00	1.00

COVER

Total Living Cover	35.00	45.00	45.00	55.00	75.00	51.00
Litter	5.00	10.00	10.00	30.00	15.00	14.00
Bareground	35.00	10.00	25.00	10.00	5.00	17.00
Rock	25.00	35.00	20.00	5.00	5.00	18.00

% COMPOSITION

Shrubs	42.86	11.11	77.78	45.45	20.00	39.44
Forbs	57.14	66.67	11.11	54.55	80.00	53.89
Grasses	0.00	22.22	11.11	0.00	0.00	6.67

ENERGY WEST-COTTONWOOD MINE

TEST PLOTS '88

Test Plot #5 (T5)

Slope: 35 deg

Exposure: E(S)

Sample Date: 10-15 Aug 98

SDev	Freq	
8.12	60.00	SHRUBS
8.60	80.00	<i>Chrysothamnus nauseosus</i>
		<i>Erigonum corymbosum</i>

18.00	100.00	FORBS
		<i>Aster chilensis</i>

2.00	20.00	GRASSES
2.00	20.00	<i>Elymus lanceolatus</i>
2.00	20.00	<i>Elymus spicatus</i>
		<i>Hordeum jubatum</i>

13.56		COVER
8.60		Total Living Cover
11.22		Litter
11.66		Bareground
		Rock

23.23		% COMPOSITION
23.18		Shrubs
8.89		Forbs
		Grasses

ENERGY WEST-COTTONWOOD MINE

TEST PLOTS '88

Test Plot #6 (T6)

Slope: 35 deg

Exposure: E(S)

Sample Date: 10-15 Aug 98

1.00 2.00 3.00 4.00 5.00 Mean

SHRUBS

Chrysothamnus nauseosus 0.00 0.00 5.00 0.00 5.00 2.00

FORBS

Aster chilensis 50.00 55.00 70.00 50.00 20.00 49.00

GRASSES

Elymus lanceolatus 10.00 10.00 0.00 15.00 10.00 9.00

Elymus spicatus 0.00 0.00 0.00 0.00 10.00 2.00

COVER

Total Living Cover 60.00 65.00 75.00 65.00 45.00 62.00

Litter 10.00 10.00 15.00 10.00 10.00 11.00

Bareground 15.00 10.00 5.00 10.00 25.00 13.00

Rock 15.00 15.00 5.00 15.00 20.00 14.00

% COMPOSITION

Shrubs 0.00 0.00 6.67 0.00 11.11 3.56

Forbs 83.33 84.62 93.33 76.92 44.44 76.53

Grasses 16.67 15.38 0.00 23.08 44.44 19.91

ENERGY WEST-COTTONWOOD MINE

TEST PLOTS '88

Test Plot #6 (T6)

Slope: 35 deg

Exposure: E(S)

Sample Date: 6-10 Aug 97

SDev	Freq	
2.45	40.00	SHRUBS <i>Chrysothamnus nauseosus</i>

16.25	100.00	FORBS <i>Aster chilensis</i>
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4.90	80.00	GRASSES <i>Elymus lanceolatus</i>
4.00	20.00	<i>Elymus spicatus</i>

9.80		COVER Total Living Cover
2.00		Litter
6.78		Bareground
4.90		Rock

4.58		% COMPOSITION Shrubs
16.87		Forbs
14.42		Grasses

ENERGY WEST-COTTONWOOD MINE

TEST PLOTS '88

Test Plot #7 (T7)

Slope: 35 deg

Exposure: E(S)

Sample Date: 10-15 Aug 98

1.00 2.00 3.00 4.00 5.00 Mean

SHRUBS

Chrysothamnus nauseosus 0.00 0.00 0.00 5.00 0.00 1.00

FORBS

Aster chilensis 35.00 20.00 65.00 40.00 55.00 43.00

GRASSES

Elymus cinereus 0.00 10.00 0.00 5.00 0.00 3.00

Elymus lanceolatus 15.00 20.00 0.00 0.00 10.00 9.00

Elymus spicatus 0.00 0.00 0.00 15.00 0.00 3.00

COVER

Total Living Cover 50.00 50.00 65.00 65.00 65.00 59.00

Litter 10.00 15.00 15.00 20.00 10.00 14.00

Bareground 25.00 25.00 15.00 10.00 15.00 18.00

Rock 15.00 10.00 5.00 5.00 10.00 9.00

% COMPOSITION

Shrubs 0.00 0.00 0.00 7.69 0.00 1.54

Forbs 70.00 40.00 100.00 61.54 84.62 71.23

Grasses 30.00 60.00 0.00 30.77 15.38 27.23

ENERGY WEST-COTTONWOOD MINE

TEST PLOTS '88

Test Plot #7 (T7)

Slope: 35 deg

Exposure: E(S)

Sample Date: 10-15 Aug 98

SDev	Freq	
2.00	20.00	SHRUBS <i>Chrysothamnus nauseosus</i>

15.68	100.00	FORBS <i>Aster chilensis</i>
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4.00	40.00	GRASSES <i>Elymus cinereus</i>
8.00	60.00	<i>Elymus lanceolatus</i>
6.00	20.00	<i>Elymus spicatus</i>

7.35		COVER Total Living Cover
3.74		Litter
6.00		Bareground
3.74		Rock

3.08		% COMPOSITION Shrubs
20.38		Forbs
19.88		Grasses

ENERGY WEST-COTTONWOOD MINE

TEST PLOTS '88

Test Plot #8 (T8)

Slope: 35 deg

Exposure: E(S)

Sample Date: 10-15 Aug 98

	1.00	2.00	3.00	4.00	5.00	Mean
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SHRUBS

<i>Chrysothamnus nauseosus</i>	5.00	5.00	25.00	10.00	15.00	12.00
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<i>Eriogonum corymbosum</i>	0.00	0.00	0.00	15.00	0.00	3.00
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FORBS

<i>Aster chilensis</i>	60.00	50.00	30.00	10.00	35.00	37.00
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GRASSES

<i>Elymus lanceolatus</i>	0.00	0.00	0.00	0.00	10.00	2.00
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COVER

Total Living Cover	65.00	55.00	55.00	35.00	60.00	54.00
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Litter	15.00	25.00	10.00	10.00	10.00	14.00
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Bareground	10.00	15.00	15.00	20.00	10.00	14.00
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Rock	10.00	5.00	20.00	35.00	20.00	18.00
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% COMPOSITION

Shrubs	7.69	9.09	45.45	71.43	25.00	31.73
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Forbs	92.31	90.91	54.55	28.57	58.33	64.93
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Grasses	0.00	0.00	0.00	0.00	16.67	3.33
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ENERGY WEST-COTTONWOOD MINE

TEST PLOTS '88

Test Plot #8 (T8)

Slope: 35 deg

Exposure: E(S)

Sample Date: 10-15 Aug 98

SDev	Freq	
7.48	100.00	SHRUBS
6.00	20.00	<i>Chrysothamnus nauseosus</i>
		<i>Eriogonum corymbosum</i>

17.20	100.00	FORBS
		<i>Aster chilensis</i>

4.00	20.00	GRASSES
		<i>Elymus lanceolatus</i>

10.20		COVER
5.83		Total Living Cover
3.74		Litter
10.30		Bareground
		Rock

24.08		% COMPOSITION
24.07		Shrubs
6.67		Forbs
		Grasses

PACIFICORP (ENERGY WEST)
 QUALITATIVE SAMPLING DATA SHEET AND
 QUANTITATIVE/QUALITATIVE NOTES
 1998

SITE NAME: Cell #1

AREA: Cottonwood Mine Old Waste Rock Area (1983 Interim Reveg)

DATE: August 17-22, 1998

WORKERS: P. Collins, D. Collins

SLOPE: 0-1 deg.

EXPOSURE: E

ANIMAL USE/DISTURBANCE: slight to moderate

EROSION: Negligible

COVER: qualitative data only for 1997 and 1998

DOMINANT PLANT SPECIES OBSERVED:

Atriplex confertifolia
Artemisia tridentata
Atriplex canescens
Chrysothamnus nauseosus
Cercocarpus montanus
Gutierrezia sarothrae

Agropyron cristatum
Elymus lanceolatus
Elymus smithii
Stipa comata
Stipa hymenoides

WOODY SPECIES DENSITY:

	Individuals/Ac		
	<u>1994</u>	<u>1995</u>	<u>1996</u>
<i>Artemisia tridentata</i>	229.80		183.02
<i>Atriplex canescens</i>	804.29	1541.95	1342.18
<i>Atriplex confertifolia</i>	76.60		
<i>Ceratoides lanata</i>			61.01
<i>Cercocarpus montanus</i>	76.60		
<i>Chrysothamnus nauseosus</i>	153.20	626.42	305.04
<i>Ephedra viridis</i>			61.01
<i>Gutierrezia sarothrae</i>	<u>957.48</u>	<u>2650.22</u>	<u>1708.22</u>
Total	2297.97	4818.58	3660.48

- NOTES:
- 1) Sampled qualitative data only in 1997 and 1998.
 - 2) Plot looks better each year.
 - 3) Density values of previous years were shown.
 - 4) Many shrubs are mature.

PACIFICORP (ENERGY WEST)
 QUALITATIVE SAMPLING DATA SHEET AND
 QUANTITATIVE/QUALITATIVE NOTES
 1998

SITE NAME: Cell #2

AREA: Cottonwood Mine Old Waste Rock Area (1984 Interim Reveg)

DATE: August 17-22, 1998

WORKERS: P. Collins, D. Collins

SLOPE: 0-1 deg.

EXPOSURE: E

AREA: ~ 1 acre

ANIMAL USE/DISTURBANCE:

EROSION: Negligible

COVER: No cover taken this year.

DOMINANT PLANT SPECIES OBSERVED:

Artemisia tridentata
Atriplex canescens
Atriplex confertifolia
Gutierrezia sarothrae
Halogeton glomeratus

Agropyron cristatum
Elymus cinereus
Elymus lanceolatus
Elymus spicatus
Elymus hispidus
Elymus smithii
Hilaria jamesii
Sitanion hystrix
Stipa hymenoides

DENSITY:

	Number/Acre			
	<u>1994</u>	<u>1995</u>	<u>1996</u>	<u>1997</u>
<i>Artemisia tridentata</i>			28.48	
<i>Atriplex canescens</i>	834.88	878.17	825.44	1460.84
<i>Atriplex confertifolia</i>	53.29	27.88	28.48	292.17
<i>Chrysothamnus nauseosus</i>	17.76	97.57	58.96	
<i>Gutierrezia sarothrae</i>	142.11	376.36	<u>825.44</u>	<u>1753.01</u>
<i>Artemisia tridentata</i>	<u>17.76</u>	<u>27.88</u>		
Total	1065.80	1393.92	1760.80	3506.02

PRODUCTION:	1997
	(<u>lbs/ac</u>)
Herbaceous	290.47
Woody	<u>657.45</u>
Total	907.92

NOTES: 1) Qualitative data taken only in 1998.

PACIFICORP (ENERGY WEST)
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1998

SITE NAME: Cell #3

AREA: Cottonwood Mine Old Waste Rock Area (1985 Interim Reveg)

DATE: August 17-22, 1998

WORKERS: P. Collins, D. Collins

SLOPE: 0-1 deg.

EXPOSURE: E

ANIMAL USE/DISTURBANCE: Slight

EROSION: Negligible

COVER: (Quantitative data only this year)

DOMINANT PLANT SPECIES OBSERVED:

Atriplex canescens
Atriplex confertifolia
Ephedra viridis
Gutierrezia sarothrae

Agropyron cristatum
Elymus lanceolatus
Elymus smithii
Hilaria jamesii
Stipa hymenoides
Stipa comata

DENSITY:

	<u>1994</u>	<u>1995</u>	<u>1996</u>	<u>1997</u>
<i>Atriplex canescens</i>	1137.23	1836.38	1548.88	2342.27
<i>Chrysothamnus nauseosus</i>	101.09	135.03	55.32	
<i>Gutierrezia sarothrae</i>	277.99	621.13	1659.52	6558.36
<i>Atriplex confertifolia</i>		54.01		321.30
<i>Cercocarpus ledifolius</i>		54.01		
<i>Yucca harrimaniae</i>			55.32	
<i>Ephedra viridis</i>				156.15
Totals	1516.31	2700.56	3319.03	9369.08

PRODUCTION:

	<u>1997</u> <u>(lbs/ac)</u>
Herbaceous	192.57
Woody	<u>8.44</u>
Total	201.01

- NOTES:
- 1) We took qualitative data only this year, but the previous years', density measurements were left for future comparisons.
 - 2) Like 1993-97, there was more density of shrubs here than in Cell 2.
 - 3) Diversity in the cover was best (in descending order: Cell 3, Cell 2, Cell 1).
 - 4) Condition: excellent.
 - 5) Site had good diversity of grasses.

PACIFICORP (ENERGY WEST)
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1998

SITE NAME: Cell #4

AREA: Cottonwood Mine Old Waste Rock Area ('86 Interim Reveg)

DATE: August 17-22, 1998

WORKERS: P. Collins, D. Collins

SLOPE: 0 - 1 deg

EXPOSURE: E

ANIMAL USE/DISTURBANCE: Much cattle use. Moderate deer and
rabbit use.

EROSION: negligible

COVER: see quantitative data

DOMINANT PLANT SPECIES OBSERVED: (see also quantitative data)

Cercocarpus montanus
Gutierrezia sarothrae

Lactuca serriola
Machaeranthera grindelioides
Sphaeralcea grossulariifolia

Agropyron cristatum
Bromus tectorum
Elymus spicatus
Elymus smithii
Elymus hispidus
Elymus lanceolatus
Hilaria jamesii
Stipa comata

WOODY SPECIES DENSITY:

	Number/Acre			
	<u>1995</u>	<u>1996</u>	<u>1997</u>	<u>1998</u>
<i>Atriplex canescens</i>	43.56	116.16	92.93	69.70
<i>Cercocarpus ledifolius</i>	21.78			
<i>Cercocarpus montanus</i>			23.23	
<i>Chrysothamnus nauseosus</i>	32.67	46.46	23.23	23.23
<i>Gutierrezia sarothrae</i>	<u>21.78</u>	<u>92.93</u>	<u>1045.44</u>	<u>278.78</u>
TOTAL	119.79	255.55	1184.83	371.71

PRODUCTION:	1997	(<u>lbs/ac</u>)	1998
Herbaceous	192.57		361.45
Woody	<u>8.44</u>		<u>69.78</u>
Total	201.01		431.23

NOTES:

- 1) This is the first year we saw a significant amount of galleta.
- 2) There was good grass cover, but not so for forbs and shrubs.
- 3) Put down one long transect, sampled with a random number at right angle every 25 ft.
- 4) Sampled cover (n=15) and frequency (n=15) by ocular methods.
- 5) Sampled density (n=15) using 5'x25' belt transects.
- 6) Sampled productivity [n=10(50)] by clipping, weighing and double sampling.

ENERGY WEST-COTTONWOOD MINE

Cell #4

Old Waste Rock (Interim Reveg '86)

Slope: 0-1 deg

Exposure: NE

Sample Date: 17-22 Aug 98

	1.00	2.00	3.00	4.00	5.00	6.00
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SHRUBS

<i>Atriplex canescens</i>	0.00	0.00	0.00	0.00	0.00	0.00
<i>Cercocarpus montanus</i>	0.00	0.00	0.00	0.00	1.00	0.00
<i>Chrysothamnus nauseosus</i>	20.00	0.00	0.00	0.00	0.00	0.00
<i>Gutierrezia sarothrae</i>	0.00	0.00	10.00	0.00	0.00	0.00

FORBS

GRASSES

<i>Agropyron cristatum</i>	0.00	0.00	20.00	35.00	0.00	0.00
<i>Elymus lanceolatus</i>	0.00	5.00	10.00	0.00	5.00	0.00
<i>Elymus smithii</i>	5.00	5.00	0.00	0.00	10.00	40.00
<i>Hilaria jamesii</i>	5.00	5.00	10.00	10.00	39.00	10.00
<i>Stipa comata</i>	0.00	0.00	0.00	0.00	0.00	0.00
<i>Stipa hymenoides</i>	5.00	5.00	0.00	5.00	0.00	0.00

COVER

Total Living Cover	35.00	20.00	50.00	50.00	55.00	50.00
Litter	15.00	5.00	10.00	15.00	10.00	10.00
Bareground	10.00	10.00	10.00	15.00	15.00	10.00
Rock	40.00	65.00	30.00	20.00	20.00	30.00

% COMPOSITION

Shrubs	57.14	0.00	20.00	0.00	1.82	0.00
Forbs	0.00	0.00	0.00	0.00	0.00	0.00
Grasses	42.86	100.00	80.00	100.00	98.18	100.00

7.00	8.00	9.00	10.00	11.00	12.00	13.00	14.00	15.00
0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

60.00	10.00	20.00	0.00	0.00	10.00	0.00	0.00	0.00
0.00	0.00	10.00	10.00	0.00	10.00	10.00	10.00	0.00
0.00	25.00	10.00	25.00	45.00	10.00	15.00	25.00	55.00
5.00	10.00	5.00	10.00	0.00	10.00	5.00	0.00	5.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.00	0.00
0.00	0.00	0.00	20.00	0.00	10.00	0.00	0.00	0.00

65.00	45.00	45.00	65.00	45.00	50.00	35.00	50.00	60.00
5.00	20.00	20.00	20.00	10.00	15.00	10.00	20.00	25.00
10.00	5.00	10.00	5.00	10.00	10.00	15.00	15.00	5.00
20.00	30.00	25.00	10.00	35.00	25.00	40.00	15.00	10.00

0.00	0.00	0.00	0.00	0.00	0.00	14.29	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	100.00	100.00	100.00	100.00	100.00	85.71	100.00	100.00

ENERGY WEST-COTTONWOOD MINE

Cell #4

Old Waste Rock (Interim Reveg '86)

Slope: 0-1 deg

Exposure: NE

Sample Date: 17-22 Aug 98

Mean	SDev	Freq	
0.33	1.25	6.67	SHRUBS
0.07	0.25	6.67	<i>Atriplex canescens</i>
1.33	4.99	6.67	<i>Cercocarpus montanus</i>
0.67	2.49	6.67	<i>Chrysothamnus nauseosus</i>
			<i>Gutierrezia sarothrae</i>

FORBS

Mean	SDev	Freq	
10.33	16.78	40.00	GRASSES
4.67	4.64	53.33	<i>Agropyron cristatum</i>
18.00	16.81	80.00	<i>Elymus lanceolatus</i>
8.60	8.80	86.67	<i>Elymus smithii</i>
1.15	4.00	6.67	<i>Hilaria jamesii</i>
3.00	5.42	33.33	<i>Stipa comata</i>
			<i>Stipa hymenoides</i>

Mean	SDev	Freq	
48.00	11.37		COVER
14.00	5.83		Total Living Cover
10.33	3.40		Litter
27.67	13.52		Bareground
			Rock

Mean	SDev	Freq	
6.22	14.82		% COMPOSITION
0.00	0.00		Shrubs
93.78	14.82		Forbs
			Grasses

PACIFICORP (ENERGY WEST)
 QUALITATIVE SAMPLING DATA SHEET AND
 QUANTITATIVE/QUALITATIVE NOTES
 1998

SITE NAME: Cell #5 '89 (Reseeded) 93

AREA: Cottonwood Mine Old Waste Rock Area (Interim Reveg)

DATE: August 17-22, 1998

WORKERS: P. Collins, D. Collins

SLOPE: 0-1 deg

EXPOSURE: E

ANIMAL USE/DISTURBANCE: Used by deer and rabbits mostly

EROSION: Negligible

COVER: (see quantitative data)

DOMINANT PLANT SPECIES OBSERVED:

Atriplex canescens

Kochia scoparia

Malcomia africana

Sisymbrium altissimum

Agropyron cristatum

Bromus tectorum

Elymus lanceolatus

Hordeum jubatum

Stipa comata

WOODY SPECIES DENSITY:

	Number/Acre		
	<u>1995</u>	<u>1996</u>	<u>1998</u>
<i>Atriplex canescens</i>	609.84	627.26	1068.67
<i>Cercocarpus ledifolius</i>	10.89		
<i>Chrysothamnus nauseosus</i>	10.89		
<i>Gutierrezia sarothrae</i>			69.70
TOTAL	<u>631.62</u>	<u>627.26</u>	<u>1138.37</u>

PRODUCTION:	1998
	(<u>lbs/ac</u>)
Herbaceous	566.24
Woody	<u>262.45</u>
Total	828.69

- NOTES:
- 1) Shrub representation was "fair". Those shrubs present were large and mature. Not a lot of shrub cover, however.
 - 2) Nearly no forb or weed cover, but good grass cover and diversity.
 - 3) Put down one long transect, sampled with a random number at right angle every 25 ft.
 - 4) Sampled cover (n=15) and frequency (n=15) by ocular methods.
 - 5) Sampled density (n=15) using 5'x25' belt transects.
 - 6) Sampled productivity [n=10(50)] by clipping, weighing and double sampling.

ENERGY WEST-COTTONWOOD MINE

Cell #5 '89

Old Waste Rock (Interim Reveg - Reseeded '93)

Slope: 0-1 deg

Exposure: E

Sample Date: 17-22 Aug 9

	1.00	2.00	3.00	4.00	5.00	6.00	7.00
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TREES & SHRUBS

<i>Atriplex canescens</i>	0.00	5.00	5.00	25.00	0.00	0.00	15.00
<i>Gutierrezia sarothrae</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00

FORBS

<i>Sphaeralcea grossulariifoli</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00
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GRASSES

<i>Agropyron cristatum</i>	0.00	30.00	35.00	25.00	20.00	5.00	30.00
<i>Bromus tectorum</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Elymus lanceolatus</i>	0.00	0.00	0.00	0.00	10.00	0.00	0.00
<i>Elymus smithii</i>	0.00	0.00	10.00	0.00	10.00	0.00	0.00
<i>Elymus spicatus</i>	0.00	0.00	0.00	0.00	0.00	45.00	5.00
<i>Stipa comata</i>	0.00	0.00	5.00	0.00	10.00	0.00	10.00
<i>Stipa hymenoides</i>	35.00	0.00	5.00	0.00	0.00	0.00	0.00

COVER

Total Living Cover	35.00	35.00	60.00	50.00	50.00	50.00	60.00
Litter	5.00	10.00	15.00	10.00	10.00	5.00	10.00
Bareground	10.00	15.00	15.00	20.00	20.00	10.00	20.00
Rock	50.00	40.00	10.00	20.00	20.00	35.00	10.00

% COMPOSITION

Shrubs	0.00	14.29	8.33	50.00	0.00	0.00	25.00
Forbs	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grasses	100.00	85.71	91.67	50.00	100.00	100.00	75.00

8.00	9.00	10.00	11.00	12.00	13.00	14.00	15.00	Mean
0.00	45.00	15.00	0.00	0.00	15.00	0.00	5.00	8.67
0.00	5.00	0.00	0.00	0.00	5.00	0.00	0.00	0.67
0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.33
20.00	10.00	25.00	15.00	25.00	0.00	25.00	30.00	19.67
0.00	0.00	0.00	0.00	0.00	0.00	10.00	0.00	0.67
0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00	1.00
0.00	0.00	0.00	20.00	20.00	0.00	0.00	10.00	4.67
5.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	4.00
0.00	5.00	0.00	0.00	5.00	35.00	10.00	0.00	5.33
15.00	0.00	0.00	10.00	0.00	0.00	0.00	0.00	4.33
40.00	65.00	40.00	50.00	55.00	55.00	45.00	50.00	49.33
10.00	20.00	5.00	5.00	5.00	10.00	10.00	10.00	9.33
25.00	5.00	15.00	25.00	20.00	10.00	10.00	25.00	16.33
25.00	10.00	40.00	20.00	20.00	25.00	35.00	15.00	25.00
0.00	76.92	37.50	0.00	0.00	36.36	0.00	10.00	17.23
0.00	0.00	0.00	0.00	9.09	0.00	0.00	0.00	0.61
100.00	23.08	62.50	100.00	90.91	63.64	100.00	90.00	82.17

ENERGY WEST-COTTONWOOD MINE

Cell #5 '89

Old Waste Rock (Interim Reveg - Reseeded '93)

Slope: 0-1 deg

Exposure: E

Sample Date: 17-22 Aug 98

SDev	Freq	
<hr/>		
		TREES & SHRUBS
12.31	53.33	<i>Atriplex canescens</i>
1.70	13.33	<i>Gutierrezia sarothrae</i>
		FORBS
1.25	6.67	<i>Sphaeralcea grossulariifolia</i>
		GRASSES
10.87	86.67	<i>Agropyron cristatum</i>
2.49	6.67	<i>Bromus tectorum</i>
2.71	13.33	<i>Elymus lanceolatus</i>
7.18	33.33	<i>Elymus smithii</i>
11.14	26.67	<i>Elymus spicatus</i>
8.84	46.67	<i>Stipa comata</i>
9.29	26.67	<i>Stipa hymenoides</i>
<hr/>		
		COVER
8.73		Total Living Cover
4.03		Litter
6.18		Bareground
11.97		Rock
<hr/>		
		% COMPOSITION
22.65		Shrubs
2.27		Forbs
22.30		Grasses
<hr/>		

PACIFICORP (ENERGY WEST)
 QUALITATIVE SAMPLING DATA SHEET AND
 QUANTITATIVE/QUALITATIVE NOTES
 1998

SITE NAME: Cell #6 '89 (Reseeded) '93

AREA: Cottonwood Mine Waste Rock Area (Interim Reveg)

DATE: August 17-22, 1998

WORKERS: P. Collins, D. Collins

SLOPE: 0-1 deg.

EXPOSURE: E

ANIMAL USE/DISTURBANCE: Used intensively by deer and rabbits.

EROSION: Negligible

COVER: Qualitative data only this year

DOMINANT PLANT SPECIES OBSERVED:

Atriplex canescens

Kochia scoparia

Malcomia africana

Sisymbrium altissimum

Halogeton glomeratus

Agropyron cristatum

Bromus tectorum

Elymus lanceolatus

Hordeum jubatum

Stipa comata

Stipa hymenoides

WOODY SPECIES DENSITY:

	Individuals/Acre		
	<u>1995</u>	<u>1996</u>	<u>1998</u>
<i>Atriplex canescens</i>	500.94	627.26	696.96
<i>Artemisia tridentata</i>			441.41
<i>Chrysothamnus nauseosus</i>			23.23
<i>Gutierrezia sarothrae</i>	10.89		
TOTAL	<u><u>511.83</u></u>	<u><u>627.26</u></u>	<u><u>1161.60</u></u>

PRODUCTION:	1998
	(<u>lbs/ac</u>)
Herbaceous	285.37
Woody	<u>373.44</u>
Total	658.81

- NOTES:
- 1) Some areas looked good, while others looked poor (poorest near center of cell). Areas around parameter of cell looked good with good grass and shrub cover.
 - 2) This difference could be the result of a soil problem or poor seed coverage when seeded.
 - 3) Previous density data also include and shown above for comparisons.
 - 4) General condition was fair, but not as good as Cell 5.
 - 5) Lots of weeds were present, but there was also a good representation of grasses.
 - 6) Put down one long transect, sampled with a random number at right angle every 25 ft.
 - 7) Sampled cover (n=15) and frequency (n=15) by ocular methods.
 - 8) Sampled density (n=15) using 5'x25' belt transects.
 - 9) Sampled productivity [n=10(50)] by clipping, weighing and double sampling.

ENERGY WEST-COTTONWOOD MINE

Cell #6 '89

Old Waste Rock (Interim Reveg - Reseeded '93)

Slope: 0-1 deg

Exposure: E

Sample Date: 17-22 Aug 9

	1.00	2.00	3.00	4.00	5.00	6.00	7.00
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TREES & SHRUBS

<i>Atriplex canescens</i>	0.00	2.00	0.00	0.00	10.00	0.00	10.00
<i>Chrysothamnus nauseosu</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Gutierrezia sarothrae</i>	5.00	0.00	5.00	0.00	0.00	0.00	0.00

FORBS

<i>Halogeton glomeratus</i>	0.00	25.00	0.00	20.00	0.00	20.00	0.00
<i>Kochia scoparia</i>	0.00	0.00	0.00	0.00	0.00	10.00	0.00

GRASSES

<i>Agropyron cristatum</i>	10.00	3.00	25.00	0.00	0.00	0.00	0.00
<i>Bromus tectorum</i>	10.00	0.00	0.00	0.00	0.00	10.00	0.00
<i>Elymus cinereus</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Elymus lanceolatus</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Elymus smithii</i>	0.00	0.00	0.00	20.00	50.00	10.00	0.00
<i>Poa secunda</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Stipa comata</i>	0.00	0.00	0.00	0.00	0.00	0.00	40.00
<i>Stipa hymenoides</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00

COVER

Total Living Cover	25.00	30.00	30.00	40.00	60.00	50.00	50.00
Litter	45.00	5.00	10.00	10.00	10.00	10.00	15.00
Bareground	10.00	10.00	20.00	15.00	15.00	15.00	15.00
Rock	20.00	55.00	40.00	35.00	15.00	25.00	20.00

% COMPOSITION

Shrubs	20.00	6.67	16.67	0.00	16.67	0.00	20.00
Forbs	0.00	83.33	0.00	50.00	0.00	60.00	0.00
Grasses	80.00	10.00	83.33	50.00	83.33	40.00	80.00

8.00	9.00	10.00	11.00	12.00	13.00	14.00	15.00	Mean
25.00	5.00	35.00	15.00	5.00	0.00	40.00	5.00	10.13
0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.33
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.67
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.33
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.67
15.00	5.00	25.00	10.00	10.00	35.00	10.00	30.00	11.87
0.00	0.00	0.00	20.00	0.00	0.00	0.00	0.00	2.67
0.00	0.00	0.00	0.00	35.00	0.00	0.00	0.00	2.33
0.00	10.00	5.00	0.00	0.00	10.00	0.00	0.00	1.67
0.00	10.00	0.00	0.00	15.00	10.00	0.00	10.00	8.33
0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.33
5.00	25.00	0.00	0.00	0.00	0.00	0.00	0.00	4.67
0.00	0.00	0.00	10.00	0.00	0.00	15.00	0.00	1.67
45.00	55.00	65.00	55.00	65.00	55.00	65.00	55.00	49.67
10.00	10.00	10.00	20.00	20.00	20.00	5.00	10.00	14.00
15.00	5.00	10.00	5.00	5.00	5.00	10.00	10.00	11.00
30.00	30.00	15.00	20.00	10.00	20.00	20.00	25.00	25.33
55.56	9.09	53.85	27.27	7.69	0.00	61.54	18.18	20.88
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.89
44.44	90.91	46.15	72.73	92.31	100.00	38.46	81.82	66.23

ENERGY WEST-COTTONWOOD MINE

Cell #6 '89

Old Waste Rock (Interim Reveg - Reseeded '93)

Slope: 0-1 deg

Exposure: E

Sample Date: 17-22 Aug 98

SDev	Freq	
<hr/>		
		TREES & SHRUBS
12.69	66.67	<i>Atriplex canescens</i>
1.25	6.67	<i>Chrysothamnus nauseosus</i>
1.70	13.33	<i>Gutierrezia sarothrae</i>
		FORBS
8.73	20.00	<i>Halogeton glomeratus</i>
2.49	6.67	<i>Kochia scoparia</i>
		GRASSES
11.32	73.33	<i>Agropyron cristatum</i>
5.73	20.00	<i>Bromus tectorum</i>
8.73	6.67	<i>Elymus cinereus</i>
3.50	20.00	<i>Elymus lanceolatus</i>
12.87	46.67	<i>Elymus smithii</i>
1.25	6.67	<i>Poa secunda</i>
11.32	20.00	<i>Stipa comata</i>
4.35	13.33	<i>Stipa hymenoides</i>
<hr/>		
		COVER
12.71		Total Living Cover
9.52		Litter
4.55		Bareground
11.03		Rock
<hr/>		
		% COMPOSITION
19.75		Shrubs
26.52		Forbs
25.09		Grasses
<hr/>		

PACIFICORP (ENERGY WEST)
 QUALITATIVE SAMPLING DATA SHEET AND
 QUANTITATIVE/QUALITATIVE NOTES
 1998

SITE NAME: Cell #7 '92 Partial Cell #7 '93

AREA: Cottonwood Mine Old Waste Rock Area (Interim Reveg)

DATE: August 17-22, 1998

WORKERS: P. Collins, D. Collins

SLOPE: 0 - 2 deg

EXPOSURE: E

ANIMAL USE/DISTURBANCE: Slight

EROSION: Negligible

COVER: Qualitative data only this year.

DOMINANT PLANT SPECIES OBSERVED:

Atriplex canescens
Ceratoides lanata
Gutierrezia sarothrae

Kochia scoparia
Malcomia africana
Sisymbrium altissimum

Agropyron cristatum
Bromus tectorum
Elymus lanceolatus
Hordeum jubatum
Stipa comata
Stipa hymenoides

WOODY SPECIES DENSITY:

	Individuals/Acre		
	<u>1995</u>	<u>1996</u>	<u>1998</u>
<i>Atriplex canescens</i>	1591.94	2044.46	1184.83
<i>Artemisia tridentata</i>	255.64	23.23	46.46
<i>Gutierrezia sarothrae</i>			46.46
<i>Ephedra viridis</i>			23.23
TOTAL	<u>1847.58</u>	<u>2067.65</u>	<u>1300.98</u>

PRODUCTION:	1998
	(<u>lbs/ac</u>)
Herbaceous	415.65
Woody	<u>44.26</u>
Total	459.91

- NOTES:
- 1) NW 265% of plot did not look good and was comprised most of weedy spp. The remainder looked pretty good with good grass cover, fair woody species diversity. Woody spp. cover was not high due to small individuals.
 - 2) Previous density data shown above for comparisons.
 - 3) Put down one long transect, sampled with a random number at right angle every 25 ft.
 - 4) Sampled cover (n=15) and frequency (n=15) by ocular methods.
 - 5) Sampled density (n=15) using 5'x25' belt transects.
 - 6) Sampled productivity [n=10(50)] by clipping, weighing and double sampling.

ENERGY WEST-COTTONWOOD MINE
 Cell #7 '92, Partial Cell #7 '93
 Old Waste Rock (Interim Reveg - Reseeded '93)
 Slope: 0-2 deg
 Exposure: E

Sample Date: 17-22 Aug 9 1.00 2.00 3.00 4.00 5.00 6.00 7.00

 TREES & SHRUBS

<i>Atriplex canescens</i>	0.00	0.00	0.00	5.00	0.00	5.00	5.00
<i>Artemisia tridentata</i>	0.00	0.00	0.00	0.00	10.00	0.00	0.00

FORBS

<i>Halogeton glomeratus</i>	20.00	20.00	30.00	0.00	0.00	0.00	0.00
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GRASSES

<i>Agropyron cristatum</i>	0.00	0.00	0.00	30.00	0.00	25.00	0.00
<i>Bromus tectorum</i>	0.00	0.00	10.00	0.00	0.00	0.00	0.00
<i>Elymus lanceolatus</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Elymus smithii</i>	20.00	20.00	0.00	5.00	40.00	0.00	50.00
<i>Elymus spicatus</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Hordeum jubatum</i>	0.00	0.00	10.00	0.00	0.00	0.00	0.00
<i>Stipa comata</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Stipa hymenoides</i>	0.00	0.00	0.00	10.00	0.00	10.00	0.00

 COVER

Total Living Cover	40.00	40.00	50.00	50.00	50.00	40.00	55.00
Litter	10.00	5.00	10.00	15.00	10.00	10.00	15.00
Bareground	15.00	25.00	10.00	15.00	20.00	10.00	20.00
Rock	35.00	30.00	30.00	20.00	20.00	40.00	10.00

 % COMPOSITION

Shrubs	0.00	0.00	0.00	10.00	20.00	12.50	9.09
Forbs	50.00	50.00	60.00	0.00	0.00	0.00	0.00
Grasses	50.00	50.00	40.00	90.00	80.00	87.50	90.91

8.00	9.00	10.00	11.00	12.00	13.00	14.00	15.00	Mean
5.00	5.00	0.00	0.00	0.00	0.00	5.00	0.00	2.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.67
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.67
15.00	0.00	0.00	0.00	0.00	0.00	25.00	30.00	8.33
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.67
0.00	0.00	5.00	0.00	0.00	0.00	5.00	0.00	0.67
35.00	45.00	30.00	20.00	0.00	0.00	20.00	0.00	19.00
0.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.33
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.67
0.00	0.00	0.00	0.00	15.00	0.00	0.00	0.00	1.00
5.00	15.00	10.00	15.00	15.00	25.00	0.00	0.00	7.00
60.00	65.00	50.00	35.00	30.00	25.00	55.00	30.00	45.00
5.00	10.00	10.00	10.00	5.00	25.00	10.00	5.00	10.33
10.00	5.00	15.00	25.00	20.00	25.00	15.00	25.00	17.00
25.00	20.00	25.00	30.00	45.00	25.00	20.00	40.00	27.67
8.33	7.69	0.00	0.00	0.00	0.00	9.09	0.00	5.11
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.67
91.67	92.31	100.00	100.00	100.00	100.00	90.91	100.00	84.22

ENERGY WEST-COTTONWOOD MINE
 Cell #7 '92, Partial Cell #7 '93
 Old Waste Rock (Interim Reveg - Reseeded '93)
 Slope: 0-2 deg
 Exposure: E
 Sample Date: 17-22 Aug 98

SDev	Freq	
<hr/>		
		TREES & SHRUBS
2.45	40.00	<i>Atriplex canescens</i>
2.49	6.67	<i>Artemisia tridentata</i>
		FORBS
9.57	20.00	<i>Halogeton glomeratus</i>
		GRASSES
12.20	33.33	<i>Agropyron cristatum</i>
2.49	6.67	<i>Bromus tectorum</i>
1.70	13.33	<i>Elymus lanceolatus</i>
17.24	66.67	<i>Elymus smithii</i>
1.25	6.67	<i>Elymus spicatus</i>
2.49	6.67	<i>Hordeum jubatum</i>
3.74	6.67	<i>Stipa comata</i>
7.70	53.33	<i>Stipa hymenoides</i>
<hr/>		
		COVER
11.40		Total Living Cover
4.99		Litter
6.27		Bareground
9.10		Rock
<hr/>		
		% COMPOSITION
6.10		Shrubs
21.44		Forbs
19.69		Grasses
<hr/>		

PACIFICORP (ENERGY WEST)
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1998

SITE NAME: Berm 1

AREA: Cottonwood Mine Old Waste Rock Area (1983 Interim Reveg)

DATE: August 17-22, 1998

WORKERS: P. Collins, D. Collins

SLOPE: 1-20 deg.

EXPOSURE: E

ANIMAL USE/DISTURBANCE:

EROSION: Negligible

COVER: (sampled for qualitative data only)

DOMINANT PLANT SPECIES OBSERVED:

Atriplex canescens
Chrysothamnus nauseosus
Gutierrezia sarothrae

Elymus lanceolatus
Agropyron cristatum
Elymus smithii
Stipa hymenoides

DENSITY:

	Individuals/Acre		
	<u>1994</u>	<u>1995</u>	<u>1996</u>
<i>Atriplex canescens</i>	325.36	457.38	441.41
<i>Chrysothamnus nauseosus</i>	859.88	1132.56	1417.15
<i>Ephedra viridis</i>	139.44	43.56	23.23
<i>Gutierrezia sarothrae</i>	197.54	98.01	696.96
<i>Purshia tridentata</i>	11.62		
<i>Chrysothamnus viscidiflorus</i>		10.89	
Total	1533.84	1742.40	2578.75

NOTES:

- 1) Sampled qualitatively only this year, but I left the density of previous years for future comparisons.
- 2) As mentioned previous years, poor shrub and perennial forb establishment. There were quite a few exotic weeds. The north end is worse for shrub cover and density.
- 3) 1994 through 1996 woody species density results were included for information.

PACIFICORP (ENERGY WEST)
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1998

SITE NAME: Berm 2

AREA: Cottonwood Mine Old Waste Rock Area (1984 Interim Reveg)

DATE: August 17-22, 1998

WORKERS: P. Collins, D. Collins

SLOPE: 0-20 deg.

EXPOSURE: E & N

ANIMAL USE/DISTURBANCE:

EROSION: Negligible

COVER: (qualitative data only)

DOMINANT PLANT SPECIES OBSERVED:

Artemisia tridentata
Atriplex confertifolia
Atriplex canescens
Cercocarpus montanus
Chrysothamnus nauseosus
Ephedra viridis
Gutierrezia sarothrae

Cryptantha sp.

Bromus tectorum
Elymus lanceolatus
Agropyron cristatum
Elymus smithii
Elymus elymoides
Poa secunda
Stipa hymenoides

DENSITY:	Number/Acre			
	<u>1994</u>	<u>1995</u>	<u>1996</u>	<u>1997</u>
<i>Artemisia tridentata</i>			46.46	
<i>Atriplex canescens</i>	1917.30	3637.26	2990.88	4274.69
<i>Atriplex confertifolia</i>	406.70	304.94	348.48	232.32
<i>Chrysothamnus nauseosus</i>	34.86		23.23	
<i>Ephedra viridis</i>	11.62			
<i>Brickellia microphylla</i>		21.78		
<i>Gutierrezia sarothrae</i>	<u>4241.30</u>	<u>1568.16</u>	<u>580.80</u>	<u>23.23</u>
Total	6611.78	5532.12	3089.86	4530.24

PRODUCTION:	1997 (<u>lbs/ac</u>)
Herbaceous	235.31
Woody	<u>770.73</u>
Total	1006.04

- NOTES:
- 1) Qualitative data only.
 - 2) Half of the berm has been disturbed by a new road.
 - 3) 1994, 1995, 1996 and 1997 woody species density results were included for comparisons later.
 - 4) The west side was mostly weedy species as a result of the disturbance.
 - 5) The north side has a good stand of mature woody species, but low species diversity.

PACIFICORP (ENERGY WEST)
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1998

SITE NAME: Berm 3

AREA: Cottonwood Mine Old Waste Rock Area (1985 Interim Reveg)

DATE: August 17-22, 1998

WORKERS: P. Collins, D. Collins

SLOPE: 0-20 deg.

EXPOSURE: NE & SW

ANIMAL USE/DISTURBANCE:

EROSION: Negligible

COVER: (qualitative data only this year)

DOMINANT PLANT SPECIES OBSERVED:

Artemisia tridentata
Atriplex canescens
Cercocarpus montanus
Chrysothamnus nauseosus
Ephedra viridis
Gutierrezia sarothrae

Machaeranthera grindelioides

Agropyron cristatum
Elymus smithii
Elymus lanceolatus
Stipa comata
Stipa hymenoides

DENSITY:	Individuals/Acre			
	<u>1994</u>	<u>1995</u>	<u>1996</u>	<u>1997</u>
<i>Artemisia tridentata</i>			23.23	46.46
<i>Atriplex canescens</i>	3056.06	2384.91	1928.26	3856.82
<i>Chrysothamnus nauseosus</i>	<u>11.62</u>	<u>10.89</u>	<u>23.23</u>	<u>23.23</u>
Total	3067.68	2395.80	1974.72	3856.51

PRODUCTION:	1997 (<u>lbs/ac</u>)
Herbaceous	473.83
Woody	<u>1072.61</u>
Total	1546.44

- NOTES:
- 1) We sampled for qualitative data only, but have included prev. years' density and production for comparisons in future years.
 - 2) Had good mature, shrub cover, but fair to good grass cover entire length of berm.
 - 3) Not much species diversity.

PACIFICORP (ENERGY WEST)
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1998

SITE NAME: Berm 4

AREA: Cottonwood Mine Old Waste Rock Area ('86 Interim Reveg)

DATE: August 17-22, 1998

WORKERS: P. Collins, D. Collins

SLOPE: 28 deg.

EXPOSURE: N, E

ANIMAL USE/DISTURBANCE:

EROSION: Negligible

COVER: (see quantitative data)

DOMINANT PLANT SPECIES OBSERVED:

Atriplex canescens
Chrysothamnus nauseosus
Gutierrezia sarothrae
Ephedra viridis

Agropyron cristatum
Elymus lanceolatus
Elymus smithii
Stipa hymenoides

WOODY SPECIES DENSITY:

	Individuals/Acre			
	<u>1995</u>	<u>1996</u>	<u>1997</u>	<u>1998</u>
<i>Atriplex canescens</i>	196.02	836.35	92.93	243.94
<i>Cercocarpus montanus</i>			23.23	
<i>Chrysothamnus nauseosus</i>	87.12	139.39	394.94	278.78
<i>Gutierrezia sarothrae</i>			23.23	
<i>Ephedra viridis</i>	<u>21.78</u>	<u>23.23</u>	<u>348.48</u>	<u>383.33</u>
TOTAL	304.92	998.98	882.82	906.05

PRODUCTION:

	1997	1998
	<u>(lbs/ac)</u>	
Herbaceous	722.08	731.98
Woody	<u>83.88</u>	<u>435.99</u>
Total	805.96	1167.97

NOTES:

- 1) Good cover, but poor spp. diversity.
- 2) Not many shrub spp., but those that were present were large and mature.
- 3) The map showed east and south side of the Cell 7 to sample this year for the berm.
- 4) Used 200 ft transect and sample every 20 ft.
- 5) Sampled cover (n=15) and frequency (n=15) by ocular methods.
- 6) Sampled density (n=10) with belt transects (5'X25').
- 7) Sampled productivity [n=10(50)] by clipping, weighing and double sampling.

ENERGY WEST-COTTONWOOD MINE

Berm #4

Old Waste Rock (Interim Reveg '86)

Slope: 28 deg

Exposure: NE

Sample Date: 17-22 Aug 98 1.00 2.00 3.00 4.00 5.00 6.00

SHRUBS

<i>Atriplex canescens</i>	0.00	0.00	0.00	0.00	0.00	0.00
<i>Chrysothamnus nauseosus</i>	0.00	0.00	0.00	0.00	0.00	0.00
<i>Ephedra viridis</i>	0.00	0.00	0.00	0.00	0.00	5.00

FORBS

GRASSES

<i>Agropyron cristatum</i>	30.00	50.00	50.00	35.00	40.00	30.00
<i>Elymus lanceolatus</i>	10.00	0.00	0.00	0.00	0.00	0.00
<i>Elymus smithii</i>	10.00	10.00	10.00	10.00	10.00	0.00
<i>Stipa hymenoides</i>	0.00	0.00	0.00	0.00	15.00	0.00

COVER

Total Living Cover	50.00	60.00	60.00	45.00	65.00	35.00
Litter	10.00	15.00	10.00	15.00	20.00	25.00
Bareground	10.00	15.00	20.00	15.00	10.00	15.00
Rock	30.00	10.00	10.00	25.00	5.00	25.00

% COMPOSITION

Shrubs	0.00	0.00	0.00	0.00	0.00	14.29
Forbs	0.00	0.00	0.00	0.00	0.00	0.00
Grasses	100.00	100.00	100.00	100.00	100.00	85.71

ENERGY
Berm #4
Old West
Slope: 28
Exposure:
Sample D

7.00	8.00	9.00	10.00	Mean	SDev	Freq	
35.00	0.00	0.00	40.00	7.50	15.04	20.00	SHRUBS
0.00	0.00	10.00	0.00	1.00	3.00	10.00	<i>Atriplex c</i>
0.00	5.00	0.00	0.00	1.00	2.00	20.00	<i>Chrysotha</i>
							<i>Ephedra v</i>

FORBS

0.00	15.00	0.00	10.00	26.00	17.86	80.00	GRASSE
0.00	0.00	5.00	0.00	1.50	3.20	20.00	<i>Agropyro</i>
30.00	40.00	10.00	15.00	14.50	11.06	90.00	<i>Elymus la</i>
0.00	0.00	0.00	0.00	1.50	4.50	10.00	<i>Elymus s</i>
							<i>Stipa hym</i>

65.00	60.00	25.00	65.00	53.00	13.27		COVER
10.00	20.00	5.00	10.00	14.00	5.83		Total Livi
10.00	10.00	25.00	5.00	13.50	5.50		Litter
15.00	10.00	45.00	20.00	19.50	11.50		Baregrou
							Rock
53.85	8.33	40.00	61.54	17.80	23.22		% COMP
0.00	0.00	0.00	0.00	0.00	0.00		Shrubs
46.15	91.67	60.00	38.46	82.20	23.22		Forbs
							Grasses

PACIFICORP (ENERGY WEST)
 QUALITATIVE SAMPLING DATA SHEET AND
 QUANTITATIVE/QUALITATIVE NOTES
 1998

SITE NAME: CTW Reference Area

AREA: Cottonwood Mine Old Waste Rock Area

DATE: August 17-22, 1998

WORKERS: P. Collins, D. Collins

SLOPE: 1 - 5 deg

EXPOSURE: E

ANIMAL USE/DISTURBANCE:

EROSION: Slight, natural

COVER: (qualitative data only this year)

DOMINANT PLANT SPECIES OBSERVED:

Cercocarpus montanus
Ephedra viridis
Juniperus osteosperma
Opuntia polyacantha
Pinus edulis
Yucca harrimaniae

Lepidium montanum
Descurainia pinnata
Eriogonum bicolor
Euphorbia fendleri
Penstemon pachyphyllus
Cryptantha sp.

WOODY SPECIES DENSITY:

	Numbers/Acre		
	<u>1994</u>	<u>1995</u>	<u>1996</u>
<i>Cercocarpus montanus</i>	89.03	85.02	68.68
<i>Ephedra viridis</i>	168.17	233.79	196.23
<i>Gutierrezia sarothrae</i>	9.89	10.63	
<i>Juniperus osteosperma</i>	445.15	191.29	147.17
<i>Opuntia polyacantha</i>	89.03	63.76	68.68
<i>Pinus edulis</i>	326.44	435.71	284.53
<i>Artemisia nova</i>		10.63	
<i>Yucca harrimaniae</i>	59.35	42.51	19.62
TOTAL	<u>1187.06</u>	<u>1062.70</u>	<u>784.91</u>

- NOTES:
- 1) Quantitative data only in 1997 and 1998
 - 2) I show the density of previous years' for comparisons in the future.
 - 3) Part of Reference area was disturbed by Texaco (see photograph).

PACIFICORP (ENERGY WEST)
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1998

SITE NAME: CTW Soil Pile (ABC)'94

AREA: Cottonwood Mine

DATE: August 10-15, 1998

WORKERS: P. Collins

SLOPE: 25 deg.

EXPOSURE: south

ANIMAL USE/DISTURBANCE: slight

EROSION: slight

COVER: Not sampled this year.

DOMINANT PLANT SPECIES OBSERVED:

Soil Pile A (South)

Atriplex canescens

Atriplex gardneri

Chrysothamnus nauseosus

Halogeton glomeratus

Elymus lanceolatus

Soil Pile B (North)

Atriplex canescens

Gutierrezia sarothrae

Melilotus officinalis

Halogeton glomeratus

Elymus cinereus

Elymus smithii

Stipa hymenoides

- NOTES: 1) Labeled the pile from north to south A-C [A = most north, B = middle, C = south (nearest main road)].
- 2) Qualitative data only. Same species observed.

PACIFICORP (ENERGY WEST)
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1998

SITE NAME: Road Slopes

AREA: Cottonwood Mine New Waste Rock Area (1990 Interim)

DATE: August 10-15, 1998

WORKERS: P. Collins, D. Collins

SLOPE: Variable

EXPOSURE: Variable

ANIMAL USE/DISTURBANCE: Slight

EROSION: Negligible

DOMINANT PLANT SPECIES OBSERVED:

Artemisia tridentata
Atriplex canescens
Atriplex confertifolia
Ceratoides lanata
Chrysothamnus nauseosus
Opuntia polyacantha

Hedysarum boreale
Melilotus officinalis
Lepidium montanum
Penstemon palmeri

Agropyron cristatum
Elymus lanceolatus
Elymus cinereus
Elymus spicatus
Stipa hymenoides

- NOTES: 1) Most of the plant species were desirable and weeds were much less common this year.
2) We sampled on both sides of the road (qualitative data).
3) Penstemon and Gt. Basin wildrye were most common spp. in the road side drainages (wetter areas).
4) Good species diversity.
5) Site looked excellent this year.

March 19, 1999

PACIFICORP (ENERGY WEST)
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES

1998

SITE NAME: Topsoil Stockpiles

AREA: Cottonwood Mine New Waste Rock Area (1990 Interim)

DATE: August 10-15, 1998

WORKERS: P. Collins, D. Collins

SLOPE: Variable

EXPOSURE: Variable

ANIMAL USE/DISTURBANCE: Slight

EROSION: Slight

COVER: (qualitative data only)

DOMINANT PLANT SPECIES OBSERVED:

Atriplex canescens

Atriplex confertifolia

Ceratoides lanata

Chrysothamnus nauseosus

Pinus edulis

Astragalus cicer

Hedysarum boreale

Penstemon palmeri

Elymus lanceolatus

Elymus cinereus

Elymus smithii

Elymus spicatus

Stipa hymenoides

- NOTES: 1) There were less weeds this year.
- 2) Sampled qualitatively only this year.
- 3) All areas had better representation of growth this year.

PACIFICORP (ENERGY WEST)
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1998

SITE NAME: Subsoil Piles

AREA: Cottonwood Mine New Waste Rock Area (1990 Interim)

DATE: August 10-15, 1998

WORKERS: P. Collins, D. Collins

SLOPE: Variable

EXPOSURE: Variable

ANIMAL USE/DISTURBANCE:

EROSION: Slight to moderate on unmulched north end.

COVER: (qualitative data)

DOMINANT PLANT SPECIES OBSERVED:

Artemisia tridentata
Atriplex canescens
Atriplex confertifolia
Ceratoides lanata

Halogeton glomeratus
Salsola pestifer
Malcomia africana

Bromus tectorum
Elymus lanceolatus
Elymus cinereus
Stipa hymenoides
Sitanion hystrix
Elymus spicatus

NOTES:

- 1) Qualitative data this year.
- 2) Like last year, these piles if we list by total desirable cover, it would be north (worse) to south (best).
- 3) Sloped areas that were left unmulched had about 90% weed cover; sloped areas that were mulched had less than 50% weeds. The best results were the flatter tops with mulch. They comprised less than 25% weeds - but in the depressions (gouges), there were nearly 100% desirable species.
- 4) The areas with erosion control mat has the best representation of shrub growth.
- 5) There was lots of Halogen on unmulched slopes.

PACIFICORP (ENERGY WEST)
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1998

SITE NAME: Sediment Pond Banks

AREA: Cottonwood Mine New Waste Rock Area (1990 Interim)

DATE: August 10-15, 1998

WORKERS: P. Collins, D. Collins

SLOPE: Variable

EXPOSURE: Variable

ANIMAL USE/DISTURBANCE: slight

EROSION: Negligible

COVER: (see quantitative data)

DOMINANT PLANT SPECIES OBSERVED:

Artemisia tridentata
Atriplex canescens
Atriplex confertifolia
Ceratoides lanata
Gutierrezia sarothrae

Penstemon palmeri

Elymus spicatus
Agropyron cristatum
Elymus lanceolatus
Elymus cinereus
Sporobolus airoides

- NOTES:
- 1) Fewer weedy species this year. It has improved each year.
 - 2) Site looked good and about the same as 1996.
 - 3) Sampled qualitatively only this year.

PACIFICORP (ENERGY WEST)
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1998

SITE NAME: Refuse Berm '91 (Final) - New Waste Rock Site

AREA: Cottonwood Mine

DATE: August 10-15, 1998

WORKERS: P. Collins, D. Collins

SLOPE: 28 deg.

EXPOSURE:

ANIMAL USE/DISTURBANCE: Slight

EROSION: slight

COVER: (qualitative data only)

DOMINANT PLANT SPECIES OBSERVED:

Artemisia tridentata
Atriplex canescens
Ceratoides lanata

Halogeton glomeratus
Melilotus officinalis

Elymus lanceolatus
Sitanion hystrix
Stipa hymenoides

- NOTES: 1) Site looks good.
- 2) Good density of shrubs and grasses, but few forbs.
- 3) Most of the litter on the data was erosion control mat.
- 4) Sampled qualitative data this year only.
- 5) There was a spotty, but good representation of grasses and shrubs (mostly winterfat), but few forbs.

PACIFICORP (ENERGY WEST)
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1998

SITE NAME: Refuse Berm '94 (Final) - New Waste Rock Site

AREA: Cottonwood Mine

DATE: August 10-15, 1998

WORKERS: P. Collins

SLOPE: 25 deg.

EXPOSURE: south

ANIMAL USE/DISTURBANCE: moderate

EROSION: slight

COVER: (qualitative data only)

DOMINANT PLANT SPECIES OBSERVED:

Atriplex confertifolia
Atriplex canescens
Ceratoides lanata

Melilotus officinalis

Hilaria jamesii
Hordeum jubatum
Elymus cinereus
Elymus lanceolatus

WOODY SPECIES DENSITY: 1997

	(no./ac)
<i>Eriogonum corymbosum</i>	571.31
<i>Atriplex canescens</i>	5141.74
<i>Ceratoides lanata</i>	13711.31
<i>Atriplex gardneri</i>	<u>3427.83</u>
Total	22852.19

- NOTES: 1) Qualitative data only this year, but prev. years' data remains of future comparisons.
- 2) Berms 91 and 94 seem to more grasses than 96 Berm. 94 was better than 91 with more diversity.
- 3) More galleta this year compared to previous years.

PACIFICORP (ENERGY WEST)
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1998

SITE NAME: Refuse Berm (seeded 1996)

AREA: Cottonwood Mine New Waste Rock Area (1990 Interim)

DATE: August 10 - 15, 1998

WORKERS: P. Collins, D. Collins

SLOPE: 28 deg.

EXPOSURE: S & E

ANIMAL USE/DISTURBANCE: No obvious disturbance

EROSION: Negligible

COVER: (see quantitative data)

DOMINANT PLANT SPECIES OBSERVED:

Artemisia tridentata
Atriplex canescens
Ceratoides lanata

Halogeton glomeratus
Salsola pestifer

Elymus lanceolatus

1997
(no./ac)

Chrysothamnus nauseosus

Atriplex canescens

4748.04

Atriplex gardneri

130.67

Ceratoides lanata

217.80

Total

5096.51

- NOTES:
- 1) Some areas has lots of weeds, whereas other areas had good shrub growth.
 - 2) Site was more favorable for shrubs (Atca) compared to grasses and forbs.
 - 3) For methods: cover random along a 200 ft transect (n=10). Density was by using 5'x25' belt transects (n=8).

ENERGY WEST-COTTONWOOD MINE

Refuse Berm '96 (Final)

Cottonwood Waste Rock Site 1991

Slope: 28 deg

Exposure: S & E

Sample Date: 10-15 Aug 9

	1.00	2.00	3.00	4.00	5.00	6.00	7.00
--	------	------	------	------	------	------	------

TREES & SHRUBS

<i>Atriplex canescens</i>	10.00	0.00	5.00	15.00	50.00	20.00	65.00
<i>Ceratoides lanata</i>	0.00	5.00	0.00	0.00	0.00	0.00	0.00

FORBS

<i>Halogeton glomeratus</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Salsola pestifer</i>	20.00	10.00	5.00	5.00	0.00	0.00	0.00

GRASSES

<i>Elymus lanceolatus</i>	5.00	0.00	0.00	0.00	0.00	0.00	0.00
---------------------------	------	------	------	------	------	------	------

COVER

Total Living Cover	35.00	15.00	10.00	20.00	50.00	20.00	65.00
Litter	10.00	10.00	10.00	10.00	15.00	15.00	15.00
Bareground	40.00	70.00	70.00	60.00	30.00	60.00	15.00
Rock	15.00	5.00	10.00	10.00	5.00	5.00	5.00

% COMPOSITION

Shrubs	28.57	33.33	50.00	75.00	100.00	100.00	100.00
Forbs	57.14	66.67	50.00	25.00	0.00	0.00	0.00
Grasses	14.29	0.00	0.00	0.00	0.00	0.00	0.00

ENERGY WEST-CO
 Refuse Berm '96 (Fi
 Cottonwood Waste
 Slope: 28 deg
 Exposure: S & E
 Sample Date: 10-15

8.00	9.00	10.00	Mean	SDev	Freq	
25.00	70.00	10.00	27.00	24.10	90.00	TREES & SHRUBS
5.00	0.00	5.00	1.50	2.29	30.00	<i>Atriplex canescens</i> <i>Ceratoides lanata</i>
0.00	0.00	20.00	2.00	6.00	10.00	FORBS
5.00	0.00	0.00	4.50	6.10	50.00	<i>Halogeton glomeratu</i> <i>Salsola pestifer</i>
5.00	0.00	0.00	1.00	2.00	20.00	GRASSES <i>Elymus lanceolatus</i>
40.00	70.00	35.00	36.00	19.60		COVER
15.00	15.00	15.00	13.00	2.45		Total Living Cover
35.00	5.00	30.00	41.50	21.57		Litter
10.00	10.00	20.00	9.50	4.72		Bareground
						Rock
75.00	100.00	42.86	70.48	28.01		% COMPOSITION
12.50	0.00	57.14	26.85	26.55		Shrubs
12.50	0.00	0.00	2.68	5.37		Forbs
						Grasses

COLOR
PHOTOGRAPHS



Cottonwood Mine - Old Fan Road (1 of 2)



Cottonwood Mine - Old Fan Road (2 of 2)



Cottonwood Mine - Reference Area



Cottonwood Mine - 4th East Road '86



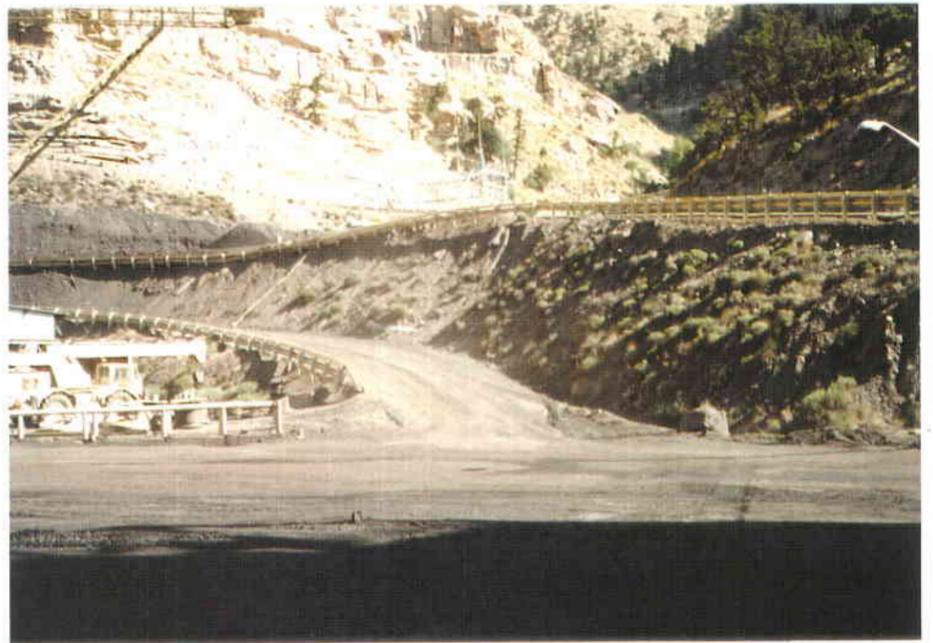
Cottonwood Mine - Storage Yard Slope



Cottonwood Mine - Parking Lot Slope



Cottonwood Mine - Road/Silo Pad Slope



Cottonwood Mine - Tipple Area Slopes



Cottonwood Mine - Sediment Pond Banks



Cottonwood Mine - Ninth East Breakout



Cottonwood Mine - Test Plots '88



Cottonwood Mine - Old Waste Rock - Cell #1



Cottonwood Mine - Old Waste Rock - Cell #2



Cottonwood Mine - Old Waste Rock - Cell #3



Cottonwood Mine - Old Waste Rock - Cell #4



Cottonwood Mine - Old Waste Rock - Cell #5



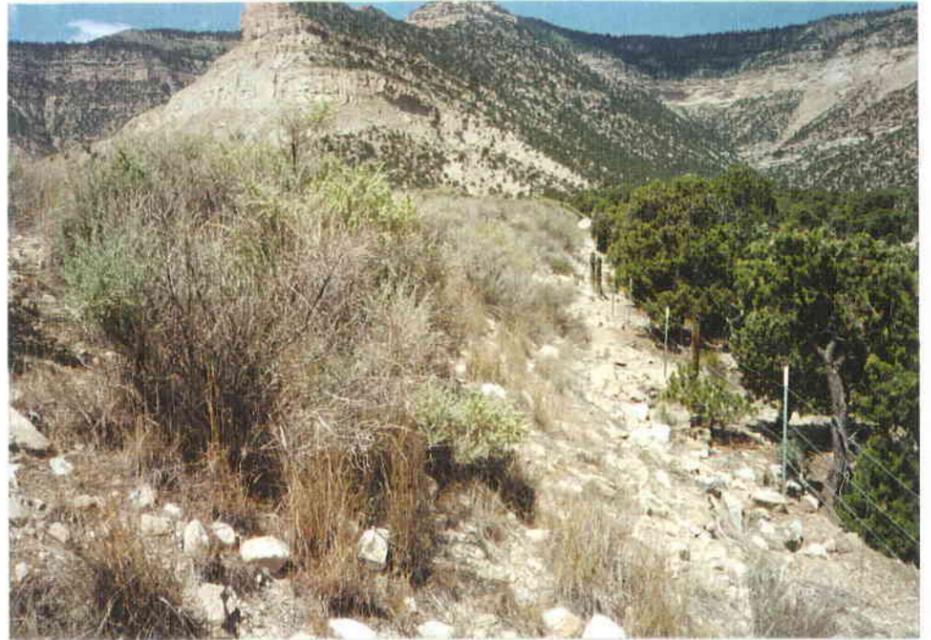
Cottonwood Mine - Old Waste Rock - Cell #6



Cottonwood Mine - Old Waste Rock - Cell #7



Cottonwood Mine - Old Waste Rock - Berm #1



Cottonwood Mine - Old Waste Rock - Berm #3



Cottonwood Mine - Old Waste Rock - Berm #4



Cottonwood Mine - Old Waste Rock
CTW Reference Area



Cottonwood Mine - Old Waste Rock
CTW Soil Piles (A,B,C) '94



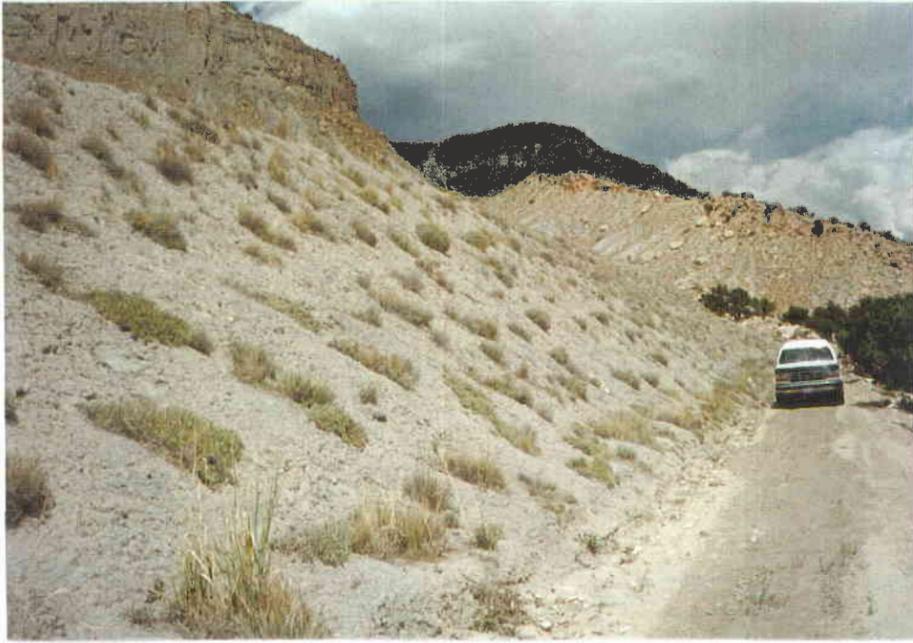
Cottonwood Mine - New Waste Rock
Road Slopes



Cottonwood Mine - New Waste Rock
Topsoil Stockpiles



Cottonwood Mine - New Waste Rock
Subsoil Piles (1 of 2)



Cottonwood Mine - New Waste Rock
Subsoil Piles (2 of 2)



Cottonwood Mine - New Waste Rock
Sediment Pond Banks



Cottonwood Mine - New Waste Rock
Refuse Berm '91 (Final)



Cottonwood Mine - New Waste Rock
Refuse Berm '94 (Final)



Cottonwood Mine - New Waste Rock
Refuse Berm '96 (Final) seeded



Cottonwood Mine - New Waste Rock
All Refuse Berms ('91, '94 & 96)

*PACIFICORP/ENERGY WEST
VEGETATION MONITORING
1998*

VOLUME II

*VEGETATION MONITORING REPORTS FOR THE
COTTONWOOD MINE, DES-BEE-DOVE, DEER CREEK MINE,
TRAIL MOUNTAIN MINE, COTTONWOOD CANYON & RILDA CANYON*



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Report Date
March 1999



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DES-BEE-DOVE AREA

PACIFICORP (ENERGY WEST)
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1998

SITE NAME: Beehive Yard Slope

AREA: Des-Bee-Dove (1988 Reveg. Area)

DATE: August 17-22, 1998

WORKERS: P. Collins, D. Collins

SLOPE: 20-50 deg.

EXPOSURE: SE

AREA: 1.6 acres

ANIMAL USE/DISTURBANCE:

EROSION: Negligible

COVER: (see quantitative data)

DOMINANT PLANT SPECIES OBSERVED: (see also quantitative data)

Atriplex canescens
Atriplex confertifolia
Chrysothamnus nauseosus
Gutierrezia sarothrae

Halogeton glomeratus
Penstemon palmeri

Agropyron cristatum
Elymus lanceolatus
Elymus smithii
Elymus spicatus
Elymus cinereus
Stipa hymenoides

WOODY SPECIES DENSITY:*	1997	(no./ac)	1998
Total	3000		6865.06
PRODUCTION:*	1997	(lbs/ac)	1998
Herbaceous	600.00		600.00
Woody	<u>600.00</u>		<u>600.00</u>
Total	1200.00		1200.00

NOTES:

- 1) One area was planted in 1997. 80% of the cover of this area was Meof, Pepa, Erco, Chna.
- 2) Like last year, this area seems to look better than it ever has. Good species diversity.
- 3)* Methods: As in 1993 - 1997, because the slope was so steep and dangerous to sample on, we estimated the cover, density and productivity from a distance (n=10).
- 4) Good density of woody species presently established.
- 5) The chain link fence covering the ground is still holding earth well.

ENERGY WEST-DES BEE DOVE

Beehive Yard Slope

1988 Reveg Area

Acreage: 1.6

Slope: 20 - 50 deg

Exposure: SE

Sample Date: 17-22 Aug 98

1.00 2.00 3.00 4.00 5.00 6.00 7.00

SHRUBS

<i>Atriplex confertifolia</i>	20.00	10.00	50.00	20.00	20.00	0.00	0.00
<i>Chrysothamnus nauseosus</i>	20.00	10.00	0.00	0.00	0.00	20.00	20.00

FORBS

<i>Penstemon palmeri</i>	0.00	20.00	10.00	0.00	10.00	15.00	10.00
--------------------------	------	-------	-------	------	-------	-------	-------

GRASSES

<i>Elymus cinereus</i>	5.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Elymus lanceolatus</i>	5.00	0.00	0.00	0.00	10.00	0.00	0.00
<i>Elymus salinus</i>	0.00	10.00	0.00	10.00	0.00	0.00	0.00
<i>Elymus smithii</i>	0.00	0.00	0.00	0.00	10.00	0.00	0.00
<i>Elymus spicatus</i>	0.00	0.00	0.00	15.00	0.00	0.00	15.00
<i>Stipa hymenoides</i>	0.00	10.00	0.00	0.00	0.00	0.00	0.00

COVER

Total Living Cover	50.00	60.00	60.00	45.00	50.00	35.00	45.00
Litter	10.00	10.00	15.00	10.00	10.00	15.00	20.00
Bareground	10.00	10.00	20.00	15.00	15.00	10.00	20.00
Rock	30.00	20.00	5.00	30.00	25.00	40.00	15.00

% COMPOSITION

Shrubs	80.00	33.33	83.33	44.44	40.00	57.14	44.44
Forbs	0.00	33.33	16.67	0.00	20.00	42.86	22.22
Grasses	20.00	33.33	0.00	55.56	40.00	0.00	33.33

ENERGY WEST-DE
 Beehive Yard Slope
 1988 Reveg Area
 Acreage: 1.6
 Slope: 20 - 50 deg
 Exposure: SE
 Sample Date: 17-22

8.00	9.00	10.00	Mean	SDev	Freq	
<hr/>						SHRUBS
0.00	0.00	10.00	13.00	14.87	60.00	<i>Atriplex confertifolia</i>
20.00	15.00	15.00	12.00	8.43	70.00	<i>Chrysothamnus nau</i>
 						FORBS
5.00	15.00	0.00	8.50	6.73	70.00	<i>Penstemon palmeri</i>
 						GRASSES
0.00	0.00	0.00	0.50	1.50	10.00	<i>Elymus cinereus</i>
0.00	0.00	0.00	1.50	3.20	20.00	<i>Elymus lanceolatus</i>
0.00	0.00	0.00	2.00	4.00	20.00	<i>Elymus salinus</i>
0.00	0.00	20.00	3.00	6.40	20.00	<i>Elymus smithii</i>
0.00	0.00	0.00	3.00	6.00	20.00	<i>Elymus spicatus</i>
25.00	15.00	0.00	5.00	8.37	30.00	<i>Stipa hymenoides</i>
<hr/>						COVER
50.00	45.00	45.00	48.50	7.09		Total Living Cover
10.00	15.00	15.00	13.00	3.32		Litter
10.00	10.00	15.00	13.50	3.91		Bareground
30.00	30.00	25.00	25.00	9.22		Rock
<hr/>						% COMPOSITION
40.00	33.33	55.56	51.16	17.02		Shrubs
10.00	33.33	0.00	17.84	14.65		Forbs
50.00	33.33	44.44	31.00	18.12		Grasses

PACIFICORP (ENERGY WEST)
 QUALITATIVE SAMPLING DATA SHEET AND
 QUANTITATIVE/QUALITATIVE NOTES
 1998

SITE NAME: Beehive Road Berm

AREA: Des-Bee-Dove (1988 Reveg. Area)

DATE: August 17-22, 1998

WORKERS: P. Collins, D. Collins

SLOPE: 30 deg

AREA SIZE: .1 acre

EXPOSURE: Variable

ANIMAL USE/DISTURBANCE: Heavy cattle use.

EROSION: Negligible

COVER: (see quantitative data)

DOMINANT PLANT SPECIES OBSERVED: (see quantitative data)

Atriplex confertifolia
Chrysothamnus nauseosus
Eriogonum corymbosum
Ephedra viridis

Halogeton glomeratus
Penstemon palmeri

Elymus cinereus
Elymus lanceolatus
Stipa hymenoides
Elymus spicatus

WOODY SPECIES DENSITY:	1997	1998
		(<u>no./ac</u>)
<i>Chrysothamnus nauseosus</i>	3963.96	4835.16
<i>Eriogonum corymbosum</i>	87.12	174.24
<i>Atriplex confertifolia</i>	<u>827.64</u>	<u>958.32</u>
Total	4399.56	5967.72

PRODUCTION:	1997	1998
		(<u>lbs/ac</u>)
Herbaceous	22.31	51.31
Woody	<u>314.55</u>	<u>446.17</u>
Total	336.86	497.48

- NOTES: 1) We sampled at regular at 20' intervals along the berm using a 200' tape.
- 2) Sampled cover (n=8) and frequency (n=8) by ocular methods.
- 3) Sampled density (n=8) with belt transects (5'X25').
- 4) Sampled productivity [n=8] by clipping and weighing. There was no room for double sampling.
- 5) There was a better representation of desirable species this year. There were still some weedy species though.
- 6) The slope below the substation had little organic cover, but it was holding well with little erosion.
- 7) This area supported mostly woody plant spp., some grass and few weeds.

ENERGY WEST-DES BEE DOVE

Beehive Road Berm

1988 Reveg Area

Acreage: .1

Slope: 30 deg

Exposure: variable

Sample Date: 17-22 Aug 98

1.00 2.00 3.00 4.00 5.00 6.00 7.00

SHRUBS

<i>Atriplex confertifolia</i>	15.00	0.00	0.00	0.00	0.00	10.00	0.00
<i>Chrysothamnus nauseosus</i>	20.00	20.00	15.00	20.00	5.00	20.00	15.00

FORBS

<i>Halogeton glomeratus</i>	0.00	0.00	5.00	10.00	30.00	0.00	0.00
<i>Penstemon palmeri</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00

GRASSES

<i>Agropyron cristatum</i>	0.00	10.00	0.00	0.00	0.00	0.00	0.00
<i>Elymus lanceolatus</i>	0.00	0.00	0.00	0.00	0.00	10.00	20.00
<i>Elymus smithii</i>	5.00	0.00	0.00	0.00	0.00	10.00	10.00
<i>Stipa hymenoides</i>	5.00	0.00	0.00	0.00	0.00	0.00	0.00

COVER

Total Living Cover	45.00	30.00	20.00	30.00	35.00	50.00	45.00
Litter	10.00	5.00	5.00	5.00	5.00	10.00	10.00
Bareground	15.00	20.00	15.00	15.00	20.00	15.00	10.00
Rock	30.00	45.00	60.00	50.00	40.00	25.00	35.00

% COMPOSITION

Shrubs	77.78	66.67	75.00	66.67	14.29	60.00	33.33
Forbs	0.00	0.00	25.00	33.33	85.71	0.00	0.00
Grasses	22.22	33.33	0.00	0.00	0.00	40.00	66.67

ENERGY WEST-DES BEE DOVE

Beehive Road Berm

1988 Reveg Area

Acreage: .1

Slope: 30 deg

Exposure: variable

Sample Date: 17-22 Aug 98

8.00	Mean	SDev	Freq
0.00	3.13	5.56	25.00
20.00	16.88	4.96	100.00

SHRUBS

Atriplex confertifolia

Chrysothamnus nauseosus

0.00	5.63	9.82	37.50
5.00	0.63	1.65	12.50

FORBS

Halogeton glomeratus

Penstemon palmeri

0.00	1.25	3.31	12.50
0.00	3.75	6.96	25.00
0.00	3.13	4.28	37.50
25.00	3.75	8.20	25.00

GRASSES

Agropyron cristatum

Elymus lanceolatus

Elymus smithii

Stipa hymenoides

50.00	38.13	10.29
15.00	8.13	3.48
10.00	15.00	3.54
25.00	38.75	11.66

COVER

Total Living Cover

Litter

Bareground

Rock

40.00	54.22	21.10
10.00	19.26	27.88
50.00	26.53	23.77

% COMPOSITION

Shrubs

Forbs

Grasses

PACIFICORP (ENERGY WEST)
 QUALITATIVE SAMPLING DATA SHEET AND
 QUANTITATIVE/QUALITATIVE NOTES
 1998

SITE NAME: Deseret Road Berm
 AREA: Des-Bee-Dove (1988 Reveg. Area)
 DATE: August 17-22, 1998
 WORKERS: P. Collins, D. Collins
 SLOPE: 6-10 deg.
 EXPOSURE: E
 AREA: .2 acre
 ANIMAL USE/DISTURBANCE: Negligible
 EROSION: Slight
 COVER: (see quantitative data)

DOMINANT PLANT SPECIES OBSERVED:

Atriplex confertifolia
Chrysothamnus nauseosus

Bassia hyssopifolia
Halogeton glomeratus
Kochia scoparia

Elymus cinereus
Elymus lanceolatus
Sitanion hystrix
Stipa hymenoides

WOODY SPECIES DENSITY:	1997	(no./ac)	1998
<i>Chrysothamnus nauseosus</i>	418.20		453.02
<i>Atriplex confertifolia</i>	<u>243.95</u>		<u>104.54</u>
Total	662.15		557.56

PRODUCTION:	1997	(lbs/ac)	1998
Herbaceous	76.74		80.31
Woody	<u>119.57</u>		<u>148.13</u>
Total	196.31		228.44

- NOTES: 1) We sampled for cover and production at 25 ft lengths on a transect. We placed meter sq. quadrats at regular intervals along inside, top and outside of berm (nearest road).
- 2) Sampled cover (n=10) and frequency (n=10) by ocular methods.
- 3) Sampled density (n=10) with belt transects (5'X25').
- 4) Sampled productivity [n=10] by clipping and weighing. There was not enough room for double sampling.
- 5) Much of the vegetation was disturbed due to roadside maintenance.
- 6) The site seemed to still be weedy, but there was not much change from last year.
- 7) As previous three years', most of the herbaceous spp. were weedy exotic species.

ENERGY WEST-DES BEE DOVE

Desert Road Berm

1988 Reveg Area

Acreage: .2

Slope: 6-10 deg

Exposure: E

Sample Date: 17-22 Aug 98

	1.00	2.00	3.00	4.00	5.00	6.00	7.00
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SHRUBS

<i>Atriplex confertifolia</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Chrysothamnus nauseosus</i>	0.00	0.00	0.00	25.00	0.00	0.00	0.00

FORBS

<i>Halogetum glomeratus</i>	25.00	5.00	20.00	20.00	30.00	5.00	30.00
<i>Kochia scoparia</i>	10.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Penstemon palmeri</i>	0.00	0.00	0.00	0.00	0.00	25.00	0.00

GRASSES

<i>Elymus smithii</i>	0.00	50.00	20.00	5.00	0.00	0.00	0.00
<i>Stipa hymenoides</i>	5.00	0.00	0.00	5.00	0.00	0.00	0.00

COVER

Total Living Cover	40.00	55.00	40.00	55.00	30.00	30.00	30.00
Litter	10.00	10.00	5.00	10.00	5.00	20.00	5.00
Bareground	10.00	20.00	35.00	25.00	10.00	5.00	15.00
Rock	40.00	15.00	20.00	10.00	55.00	45.00	50.00

% COMPOSITION

Shrubs	0.00	0.00	0.00	45.45	0.00	0.00	0.00
Forbs	87.50	9.09	50.00	36.36	100.00	100.00	100.00
Grasses	12.50	90.91	50.00	18.18	0.00	0.00	0.00

ENERGY WEST-DE
 Desert Road Berm
 1988 Reveg Area
 Acreage: .2
 Slope: 6-10 deg
 Exposure: E
 Sample Date: 17-22

8.00	9.00	10.00	Mean	SDev	Freq	
<hr/>						SHRUBS
0.00	15.00	15.00	3.00	6.00	20.00	<i>Atriplex confertifolia</i>
0.00	0.00	0.00	2.50	7.50	10.00	<i>Chrysothamnus nau</i>
 						FORBS
5.00	10.00	0.00	15.00	10.72	90.00	<i>Halogetum glomerat</i>
0.00	0.00	0.00	1.00	3.00	10.00	<i>Kochia scoparia</i>
0.00	0.00	0.00	2.50	7.50	10.00	<i>Penstemon palmeri</i>
 						GRASSES
0.00	0.00	0.00	7.50	15.37	30.00	<i>Elymus smithii</i>
10.00	5.00	0.00	2.50	3.35	40.00	<i>Stipa hymenoides</i>
<hr/>						COVER
15.00	30.00	15.00	34.00	13.19		Total Living Cover
10.00	5.00	5.00	8.50	4.50		Litter
10.00	20.00	5.00	15.50	9.07		Bareground
65.00	45.00	75.00	42.00	20.27		Rock
<hr/>						% COMPOSITION
0.00	50.00	100.00	19.55	32.78		Shrubs
33.33	33.33	0.00	54.96	36.84		Forbs
66.67	16.67	0.00	25.49	30.78		Grasses

PACIFICORP (ENERGY WEST)
 QUALITATIVE SAMPLING DATA SHEET AND
 QUANTITATIVE/QUALITATIVE NOTES
 1998

SITE NAME: Portal Road Berm
 AREA: Des-Bee-Dove (1988 Reveg. Area)
 DATE: August 17-22, 1998
 WORKERS: P. Collins, D. Collins
 SLOPE: 30 deg.
 EXPOSURE: SW
 AREA: .1 acre
 ANIMAL USE/DISTURBANCE: Slight
 EROSION: Negligible
 COVER: (see quantitative data)

DOMINANT PLANT SPECIES OBSERVED:

Atriplex confertifolia
Chrysothamnus nauseosus
Eriogonum corymbosum

Bassia hyssopifolia
Halogeton glomeratus

Agropyron cristatum
Elymus salinus
Elymus spicatus
Stipa hymenoides

WOODY SPECIES DENSITY:	1997	(no./ac)	1998
<i>Chrysothamnus nauseosus</i>	2588.72		2140.66
<i>Atriplex confertifolia</i>	3036.76		1493.49
<i>Eriogonum corymbosum</i>	<u>149.35</u>		<u>149.35</u>
Total	6621.14		3783.50
PRODUCTION:	1997	(lbs/ac)	1998
Herbaceous	53.54		275.35
Woody	<u>585.12</u>		<u>650.13</u>
Total	638.66		925.48

- NOTES: 1) We sampled at regular at 25' intervals up entire road using a 200' tape.
- 2) Sampled cover (n=7) and frequency (n=7) by ocular methods.
- 3) Sampled density (n=7) with belt transects (5'X25').
- 4) Sampled productivity (n=7) by clipping and weighing. There was no room for double sampling.
- 5) We took samples on inside, top, then on the outside of the berm.
- 6) As mentioned last year, the inside of the berm had been scraped for road maintenance. That's why it's so sparse and weedy.
- 7) Because of maintenance procedures, there were weeds inside the berm and desirable spp. on the top and outside.

ENERGY WEST-DES BEE DOVE

Portal Road Berm

1988 Reveg Area

Acreage: .1

Slope: 30 deg

Exposure: SW

Sample Date: 17-22 Aug 98

1.00 2.00 3.00 4.00 5.00 6.00 7.00

SHRUBS

<i>Atriplex confertifolia</i>	0.00	20.00	25.00	25.00	0.00	5.00	0.00
<i>Chrysothamnus nauseosus</i>	30.00	0.00	0.00	25.00	25.00	0.00	10.00

FORBS

<i>Halogeton glomeratus</i>	0.00	5.00	0.00	0.00	0.00	0.00	0.00
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GRASSES

<i>Agropyron cristatum</i>	5.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Elymus lanceolatus</i>	0.00	5.00	0.00	0.00	0.00	0.00	0.00
<i>Elymus salinus</i>	0.00	0.00	0.00	0.00	0.00	25.00	0.00
<i>Stipa hymenoides</i>	0.00	0.00	0.00	0.00	10.00	10.00	0.00

COVER

Total Living Cover	35.00	30.00	25.00	50.00	35.00	40.00	10.00
Litter	10.00	5.00	5.00	20.00	5.00	20.00	5.00
Bareground	10.00	10.00	20.00	10.00	10.00	5.00	15.00
Rock	45.00	55.00	50.00	20.00	50.00	35.00	70.00

% COMPOSITION

Shrubs	85.71	66.67	100.00	100.00	71.43	12.50	100.00
Forbs	0.00	16.67	0.00	0.00	0.00	0.00	0.00
Grasses	14.29	16.67	0.00	0.00	28.57	87.50	0.00

ENERGY WEST-DES BEE DOVE

Portal Road Berm

1988 Reveg Area

Acreage: .1

Slope: 30 deg

Exposure: SW

Sample Date: 17-22 Aug 98

Mean	SDev	Freq	
<hr/>			
			SHRUBS
10.71	11.16	57.14	<i>Atriplex confertifolia</i>
12.86	12.49	57.14	<i>Chrysothamnus nauseosus</i>
			FORBS
0.71	1.75	14.29	<i>Halogeton glomeratus</i>
			GRASSES
0.71	1.75	14.29	<i>Agropyron cristatum</i>
0.71	1.75	14.29	<i>Elymus lanceolatus</i>
3.57	8.75	14.29	<i>Elymus salinus</i>
2.86	4.52	28.57	<i>Stipa hymenoides</i>
<hr/>			
			COVER
32.14	11.61		Total Living Cover
10.00	6.55		Litter
11.43	4.40		Bareground
46.43	14.57		Rock
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			% COMPOSITION
76.62	29.18		Shrubs
2.38	5.83		Forbs
21.00	28.95		Grasses
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PACIFICORP (ENERGY WEST)
 QUALITATIVE SAMPLING DATA SHEET AND
 QUANTITATIVE/QUALITATIVE NOTES
 1998

SITE NAME: Bathhouse Road Berm
 AREA: Des-Bee-Dove (1988 Interim Reveg. Area)
 DATE: August 17-22, 1998
 WORKERS: P. Collins, D. Collins
 SLOPE: 30 deg.
 EXPOSURE: SW
 AREA: .1 acre
 ANIMAL USE/DISTURBANCE: Negligible
 EROSION: Negligible
 COVER: (see quantitative data)

DOMINANT PLANT SPECIES OBSERVED:

Atriplex confertifolia
Chrysothamnus nauseosus

Penstemon palmeri
Kochia scoparia

Elymus cinereus
Elymus lanceolatus
Stipa hymenoides

WOODY SPECIES DENSITY:	1997	(no./ac)	1998
<i>Chrysothamnus nauseosus</i>	3783.51		2538.93
<i>Eriogonum corymbosum</i>			49.78
<i>Atriplex confertifolia</i>	<u>199.32</u>		<u>448.05</u>
Total	3982.64		3036.75

PRODUCTION:	1997	(lbs/ac)	1998
Herbaceous	124.93		99.01
Woody	<u>638.55</u>		<u>616.78</u>
Total	558.35		715.79

- NOTES: 1) We sampled at regular at 20' intervals up entire road using a 200' tape.
- 2) Sampled cover (n=7) and frequency (n=7) by ocular methods.
- 3) Sampled density (n=7) with belt transects (5'X25').
- 4) Sampled productivity [n=5(35)] by clipping, weighing and double sampling.

ENERGY WEST-DES BEE DOVE

Bathhouse Road Berm

1988 Interim Reveg

Acreage: .1

Slope: 30 deg

Exposure: SW

Sample Date: 17-22 Aug 98

	1.00	2.00	3.00	4.00	5.00	6.00	7.00
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SHRUBS

<i>Chrysothamnus nauseosus</i>	25.00	15.00	20.00	25.00	45.00	30.00	25.00
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FORBS

<i>Penstemon palmeri</i>	0.00	0.00	0.00	5.00	0.00	5.00	0.00
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GRASSES

<i>Agropyron cristatum</i>	0.00	0.00	0.00	0.00	15.00	0.00	0.00
<i>Bromus tectorum</i>	0.00	0.00	0.00	5.00	0.00	5.00	
<i>Elymus lanceolatus</i>	5.00	20.00	5.00	0.00	0.00	0.00	10.00
<i>Elymus smithii</i>	0.00	0.00	5.00	0.00	0.00	5.00	5.00
<i>Stipa hymenoides</i>	0.00	0.00	0.00	10.00	0.00	5.00	0.00

COVER

Total Living Cover	30.00	35.00	30.00	45.00	60.00	50.00	40.00
Litter	10.00	10.00	10.00	20.00	20.00	20.00	10.00
Bareground	10.00	25.00	15.00	10.00	5.00	15.00	20.00
Rock	50.00	30.00	45.00	25.00	15.00	15.00	30.00

% COMPOSITION

Shrubs	83.33	42.86	66.67	55.56	75.00	60.00	62.50
Forbs	0.00	0.00	0.00	11.11	0.00	10.00	0.00
Grasses	16.67	57.14	33.33	33.33	25.00	30.00	37.50

ENERGY WEST-DES BEE DOVE

Bathhouse Road Berm

1988 Interim Reveg

Acreage: .1

Slope: 30 deg

Exposure: SW

Sample Date: 17-22 Aug 98

Mean	SDev	Freq	
26.43	8.75	100.00	SHRUBS <i>Chrysothamnus nauseosus</i>
1.43	2.26	28.57	FORBS <i>Penstemon palmeri</i>
2.14	5.25	14.29	GRASSES <i>Agropyron cristatum</i>
1.67	2.36	28.57	<i>Bromus tectorum</i>
5.71	6.78	57.14	<i>Elymus lanceolatus</i>
2.14	2.47	42.86	<i>Elymus smithii</i>
2.14	3.64	28.57	<i>Stipa hymenoides</i>
41.43	10.25		COVER
14.29	4.95		Total Living Cover
14.29	6.23		Litter
30.00	12.54		Bareground
			Rock
63.70	12.18		% COMPOSITION
3.02	4.78		Shrubs
33.28	11.60		Forbs
			Grasses

PACIFICORP (ENERGY WEST)
 QUALITATIVE SAMPLING DATA SHEET AND
 QUANTITATIVE/QUALITATIVE NOTES
 1998

SITE NAME: Tipple Slope

AREA: Des-Bee-Dove (1988 Reveg. Area)

DATE: August 17-22, 1998

WORKERS: P. Collins, D. Collins

SLOPE: 40-45 deg.

EXPOSURE: Variable

AREA: .4 acre

ANIMAL USE/DISTURBANCE: Negligible

EROSION: Slight considering how steep the slope is!

COVER: Because of dangerous slope, cover was estimated by
 nonconventional methods (see Notes*).

DOMINANT PLANT SPECIES OBSERVED:

Atriplex confertifolia
Chrysothamnus nauseosus
Eriogonum corymbosum

Halogeton glomeratus
Penstemon palmeri

Elymus cinereus
Elymus lanceolatus
Elymus salinus
Stipa hymenoides

WOODY SPECIES DENSITY:*	1997	(no./ac)	1998
Total	2500		~2500
PRODUCTION:*	1997	(lbs/ac)	1998
Herbaceous	300.00		350.00
Woody	<u>300.00</u>		<u>350.00</u>
Total	600.00		~700.00

- NOTES: 1) The slope's vegetation looked good.
- 2) Vegetation cover looked good in some areas with desirable species, while other areas were quite weedy.
- 3) *Methods: As previous years, for cover, density and productivity we had to estimate cover from a distance because the slope was much too steep to safely place quadrats.
- 4) Some coal fines were mixed in soils/spoils.

ENERGY WEST-DES BEE DOVE

Tipple Slope

1988 Reveg Area

Acreage: .4 acre

Slope: 40-45 deg

Exposure: variable

Sample Date: 17-22 Aug 98

1.00 2.00 3.00 4.00 5.00 6.00 7.00

SHRUBS

<i>Atriplex confertifolia</i>	20.00	10.00	0.00	25.00	5.00	0.00	0.00
<i>Chrysothamnus nauseosus</i>	15.00	10.00	5.00	10.00	0.00	15.00	20.00

FORBS

<i>Halogeton glomeratus</i>	0.00	0.00	0.00	0.00	5.00	0.00	0.00
<i>Penstemon palmeri</i>	0.00	5.00	20.00	5.00	0.00	0.00	10.00

GRASSES

<i>Elymus cinereus</i>	0.00	0.00	0.00	0.00	0.00	10.00	10.00
<i>Elymus lanceolatus</i>	15.00	0.00	10.00	5.00	0.00	0.00	0.00
<i>Elymus smithii</i>	0.00	0.00	10.00	0.00	0.00	10.00	0.00
<i>Elymus salinus</i>	0.00	10.00	0.00	0.00	0.00	0.00	0.00

COVER

Total Living Cover	50.00	35.00	45.00	45.00	10.00	35.00	40.00
Litter	10.00	5.00	10.00	10.00	5.00	5.00	10.00
Bareground	20.00	25.00	25.00	20.00	75.00	25.00	20.00
Rock	20.00	35.00	20.00	25.00	10.00	35.00	30.00

% COMPOSITION

Shrubs	70.00	57.14	11.11	77.78	50.00	42.86	50.00
Forbs	0.00	14.29	44.44	11.11	50.00	0.00	25.00
Grasses	30.00	28.57	44.44	11.11	0.00	57.14	25.00

ENERGY WEST-DES BEE DOVE

Tipple Slope

1988 Reveg Area

Acreage: .4 acre

Slope: 40-45 deg

Exposure: variable

Sample Date: 17-22 Aug 98

Mean	SDev	Freq	
<hr/>			
			SHRUBS
8.57	9.53	57.14	<i>Atriplex confertifolia</i>
10.71	6.23	85.71	<i>Chrysothamnus nauseosus</i>
			FORBS
0.71	1.75	14.29	<i>Halogeton glomeratus</i>
5.71	6.78	57.14	<i>Penstemon palmeri</i>
			GRASSES
2.86	4.52	28.57	<i>Elymus cinereus</i>
4.29	5.62	42.87	<i>Elymus lanceolatus</i>
2.86	4.52	28.57	<i>Elymus smithii</i>
1.43	3.50	14.29	<i>Elymus salinus</i>
<hr/>			
			COVER
37.14	12.21		Total Living Cover
7.86	2.47		Litter
30.00	18.52		Bareground
25.00	8.45		Rock
<hr/>			
			% COMPOSITION
51.27	19.91		Shrubs
20.69	18.64		Forbs
28.04	17.74		Grasses
<hr/>			

PACIFICORP (ENERGY WEST)
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1998

SITE NAME: Sediment Storage Slope

AREA: Des-Bee-Dove (1988 Interim Reveg. Area)

DATE: August 10-15, 1998

WORKERS: P. Collins, D. Collins

SLOPE: 3 - 5 deg.

EXPOSURE: S SE

AREA: 4.4 acres

ANIMAL USE/DISTURBANCE: Negligible

EROSION: Like last year, there was some slight to moderate erosion in localized areas.

COVER: (see quantitative data)

DOMINANT PLANT SPECIES OBSERVED:

Atriplex confertifolia
Atriplex gardneri
Chrysothamnus nauseosus
Eriogonum corymbosum
Sarcobatus vermiculatus
Suaeda torreyana

Atriplex powellii
Halogeton glomeratus
Kochia scoparia
Malcomia africana
Suaeda calceoliformis

WOODY SPECIES DENSITY:	1997	1998
	(no./ac)	
<i>Atriplex confertifolia</i>		132.76
<i>Atriplex gardneri</i>	1988.95	1725.93
<i>Suaeda torreyana</i>	795.58	663.82
<i>Sarcobatus vermiculatus</i>	159.12	1194.88
<i>Chrysothamnus nauseosus</i>	159.12	1593.17
<i>Atriplex corrugata</i>	<u>79.56</u>	
Total	3182.33	<u>5310.56</u>

PRODUCTION:	1997	1998
	(lbs/ac)	
Herbaceous	64.75	71.39
Woody	<u>1237.09</u>	<u>1025.15</u>
Total	1301.84	1096.54

- NOTES: 1) As last year, there was poor grass and forb cover this year. Some patchy areas had lot of weeds.
- 2) Methods: For cover we placed meter sq. quadrats at placed randomly over entire site (n=10).
- 3) Sampled cover (n=10) and frequency (n=10) by ocular methods.
- 3) Sampled density (n=10) using the pt. quarter method.
- 4) Sampled productivity [n=10(50)] by clipping, weighing and double sampling.
- 5) We didn't see any grasses this year.

ENERGY WEST-DES BEE DOVE

Sediment Storage Slope

1988 Interim Reveg

Acreage: 4.4 acre

Slope: 3 - 5 deg

Exposure: S,SE

Sample Date: 10-15 Aug 98

	1.00	2.00	3.00	4.00	5.00	6.00	7.00
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SHRUBS

<i>Atriplex gardneri</i>	0.00	0.00	0.00	20.00	5.00	5.00	10.00
<i>Chrysothamnus nauseosus</i>	10.00	0.00	10.00	0.00	0.00	0.00	0.00
<i>Sarcobatus vermiculatus</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Suaeda torreyana</i>	25.00	0.00	0.00	0.00	10.00	0.00	10.00

FORBS

<i>Halogeton glomeratus</i>	15.00	0.00	0.00	0.00	20.00	0.00	15.00
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GRASSES

<i>Elymus cinereus</i>	0.00	10.00	0.00	0.00	0.00	0.00	0.00
<i>Hordeum jubatum</i>	0.00	30.00	0.00	0.00	0.00	0.00	0.00

COVER

Total Living Cover	50.00	40.00	10.00	20.00	35.00	5.00	35.00
Litter	10.00	10.00	10.00	10.00	10.00	5.00	5.00
Bareground	35.00	45.00	70.00	65.00	50.00	80.00	55.00
Rock	5.00	5.00	10.00	5.00	5.00	10.00	5.00

% COMPOSITION

Shrubs	70.00	0.00	100.00	100.00	42.86	100.00	57.14
Forbs	30.00	0.00	0.00	0.00	57.14	0.00	42.86
Grasses	0.00	100.00	0.00	0.00	0.00	0.00	0.00

ENERGY WEST-DE
 Sediment Storage SI
 1988 Interim Reveg
 Acreage: 4.4 acre
 Slope: 3 - 5 deg
 Exposure: S,SE
 Sample Date: 10-15

8.00	9.00	10.00	Mean	SDev	Freq	
<hr/>						SHRUBS
20.00	25.00	40.00	12.50	12.70		<i>Atriplex gardneri</i>
0.00	0.00	0.00	2.00	4.00		<i>Chrysothamnus nau</i>
0.00	45.00	0.00	4.50	13.50		<i>Sarcobatus vermicul</i>
0.00	0.00	0.00	4.50	7.89		<i>Suaeda torreyana</i>
<hr/>						FORBS
0.00	0.00	0.00	5.00	7.75		<i>Halogeton glomeratu</i>
<hr/>						GRASSES
0.00	0.00	0.00	1.00	3.00		<i>Elymus cinereus</i>
0.00	0.00	0.00	3.00	9.00		<i>Hordeum jubatum</i>
<hr/>						COVER
20.00	70.00	40.00	32.50	18.47		Total Living Cover
10.00	5.00	10.00	8.50	2.29		Litter
60.00	20.00	40.00	52.00	16.91		Bareground
10.00	5.00	10.00	7.00	2.45		Rock
<hr/>						% COMPOSITION
100.00	100.00	100.00	77.00	32.73		Shrubs
0.00	0.00	0.00	13.00	20.77		Forbs
0.00	0.00	0.00	10.00	30.00		Grasses

PACIFICORP (ENERGY WEST)
 QUALITATIVE SAMPLING DATA SHEET AND
 QUANTITATIVE/QUALITATIVE NOTES
 1998

SITE NAME: Sediment Pond Banks
 AREA: Des-Bee-Dove (1988 Interim Reveg Area)
 DATE: August 10-15, 1998
 WORKERS: P. Collins, D. Collins
 SLOPE: 30 deg.
 EXPOSURE: E & W
 AREA: .9 acre
 ANIMAL USE/DISTURBANCE: Negligible
 EROSION: Negligible
 COVER: (see quantitative data)

DOMINANT PLANT SPECIES OBSERVED:

Atriplex confertifolia
Atriplex gardneri
Chrysothamnus nauseosus

Malcomia africana
Machaeranthera canescens

Agropyron cristatum
Elymus lanceolatus
Elymus spicatus
Hordeum jubatum

WOODY SPECIES DENSITY:	1997	(no./ac)	1998
<i>Chrysothamnus nauseosus</i>	3912.52		7781.63
<i>Atriplex gardneri</i>	1214.23		2593.88
<i>Atriplex confertifolia</i>	134.91		
<i>Gutierrezia sarothrae</i>	<u>134.91</u>		
Total	5396.57		<u>10375.51</u>

PRODUCTION:	1997	(<u>lbs/ac</u>)	1998
Herbaceous	111.90		76.38
Woody	<u>582.69</u>		<u>810.84</u>
Total	694.59		887.21

- NOTES: 1) We sampled at regularly around the two banks.
- 2) Sampled cover (n=10) and frequency (n=10) by ocular methods.
- 3) Sampled density (n=10) using the pt. quarter method.
- 4) Sampled productivity [n=10(50)] by clipping, weighing and double sampling.

ENERGY WEST-DES BEE DOVE

Sediment Pond Banks

1988 Interim Reveg

Acreage: .9 acre

Slope: 30 deg

Exposure: E & W

Sample Date: 10-15 Aug 98

1.00 2.00 3.00 4.00 5.00 6.00 7.00

SHRUBS

<i>Atriplex gardneri</i>	35.00	10.00	5.00	0.00	0.00	0.00	20.00
<i>Chrysothamnus nauseosus</i>	15.00	35.00	20.00	40.00	35.00	15.00	10.00

FORBS

GRASSES

<i>Elymus salinus</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Elymus spicatus</i>	0.00	0.00	0.00	0.00	15.00	0.00	0.00
<i>Hordeum jubatum</i>	0.00	0.00	0.00	0.00	10.00	0.00	0.00
<i>Stipa hymenoides</i>	0.00	0.00	10.00	0.00	0.00	0.00	0.00

COVER

Total Living Cover	50.00	45.00	35.00	40.00	60.00	15.00	30.00
Litter	10.00	20.00	15.00	25.00	20.00	5.00	10.00
Bareground	20.00	30.00	15.00	30.00	15.00	65.00	40.00
Rock	20.00	5.00	35.00	5.00	5.00	15.00	20.00

% COMPOSITION

Shrubs	100.00	100.00	71.43	100.00	58.33	100.00	100.00
Forbs	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grasses	0.00	0.00	28.57	0.00	41.67	0.00	0.00

ENERGY WEST-DE
 Sediment Pond Ban
 1988 Interim Reveg
 Acreage: .9 acre
 Slope: 30 deg
 Exposure: E & W
 Sample Date: 10-15

8.00	9.00	10.00	Mean	SDev	Freq
5.00	0.00	0.00	7.50	11.01	50.00
20.00	5.00	0.00	19.50	12.74	100.00

SHRUBS
Atriplex gardneri
Chrysothamnus nau

FORBS

0.00	0.00	20.00	2.00	6.00	10.00
0.00	0.00	0.00	1.50	4.50	10.00
0.00	0.00	0.00	1.00	3.00	10.00
0.00	0.00	0.00	1.00	3.00	10.00

GRASSES
Elymus salinus
Elymus spicatus
Hordeum jubatum
Stipa hymenoides

25.00	5.00	20.00	32.50	16.01	
10.00	5.00	20.00	14.00	6.63	
45.00	70.00	55.00	38.50	18.98	
20.00	20.00	5.00	15.00	9.49	

COVER
 Total Living Cover
 Litter
 Bareground
 Rock

100.00	100.00	0.00	82.98	31.07	
0.00	0.00	0.00	0.00	0.00	
0.00	0.00	100.00	17.02	31.07	

% COMPOSITION
 Shrubs
 Forbs
 Grasses

PACIFICORP (ENERGY WEST)
 QUALITATIVE SAMPLING DATA SHEET AND
 QUANTITATIVE/QUALITATIVE NOTES
 1998

SITE NAME: Haul Road Bench
 AREA: Des-Bee-Dove (1986 Reveg. Area)
 DATE: August 10-15, 1998
 WORKERS: P. Collins, D. Collins
 SLOPE: 3 - 5 deg.
 EXPOSURE: SW
 ANIMAL USE/DISTURBANCE: Slight
 EROSION: Slight
 COVER: (see quantitative data)

DOMINANT PLANT SPECIES OBSERVED:

Atriplex cuneata var. *gardneri*
Atriplex canescens
Atriplex confertifolia

Halogeton glomeratus
Kochia scoparia

Agropyron cristatum
Elymus cinereus
Elymus lanceolatus
Sitanion hystrix
Stipa hymenoides

WOODY SPECIES DENSITY:	1997	(no./ac)	1998
<i>Chrysothamnus nauseosus</i>	985.68		937.65
<i>Atriplex gardneri</i>	2365.62		3021.30
<i>Atriplex confertifolia</i>	98.57		
<i>Atriplex canescens</i>	394.27		104.19
<i>Sarcobatus vermiculatus</i>			104.19
<i>Ceratoides lanata</i>	<u>98.57</u>		
Total	3942.70		<u>4167.33</u>

PRODUCTION:	1997	(lbs/ac)	1998
Herbaceous	515.36		389.26
Woody	<u>326.08</u>		<u>903.47</u>
Total	940.70		1293.33

NOTES:

- 1) Sampled cover (n=10) and frequency (n=10) by ocular methods.
- 2) Sampled density (n=10) using the pt. quarter method.
- 3) Sampled productivity [n=10(50)] by clipping, weighing and double sampling.
- 4) Quantitative Methods: We placed a point at regular intervals over the area. From these points we placed the quadrats in random locations.
- 5) Unlike 1994-96, in 1997-1998 most of the species are now desirable spp. as opposed to weedy.
- 6) There is some good shrub and grass establishment occurring.

ENERGY WEST-DES BEE DOVE

Haul Road Bench

1986 Reveg Area

Acreage:

Slope: 3-5 deg

Exposure: SW

Sample Date: 10-15 Aug 98

1.00 2.00 3.00 4.00 5.00 6.00 7.00

SHRUBS

<i>Atriplex gardneri</i>	40.00	20.00	10.00	5.00	25.00	20.00	0.00
<i>Chrysothamnus nauseosus</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00

FORBS

GRASSES

<i>Agropyron cristatum</i>	0.00	15.00	25.00	0.00	20.00	0.00	0.00
<i>Elymus cinereus</i>	0.00	0.00	0.00	0.00	0.00	0.00	35.00
<i>Hordeum jubatum</i>	0.00	0.00	0.00	30.00	0.00	0.00	0.00
<i>Stipa hymenoides</i>	0.00	0.00	0.00	5.00	0.00	0.00	15.00

COVER

Total Living Cover	40.00	35.00	35.00	40.00	45.00	20.00	50.00
Litter	10.00	5.00	5.00	10.00	15.00	10.00	15.00
Bareground	25.00	35.00	35.00	40.00	30.00	45.00	25.00
Rock	25.00	25.00	25.00	10.00	10.00	25.00	10.00

% COMPOSITION

Shrubs	100.00	57.14	28.57	12.50	55.56	100.00	0.00
Forbs	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grasses	0.00	42.86	71.43	87.50	44.44	0.00	100.00

ENERGY WEST-DE
 Haul Road Bench
 1986 Reveg Area
 Acreage:
 Slope: 3-5 deg
 Exposure: SW
 Sample Date: 10-15

8.00	9.00	10.00	Mean	SDev	Freq
5.00	25.00	20.00	17.00	11.45	90.00
15.00	0.00	0.00	1.50	4.50	10.00

SHRUBS
Atriplex gardneri
Chrysothamnus nau

FORBS

30.00	25.00	5.00	12.00	11.66	60.00
0.00	0.00	0.00	3.50	10.50	10.00
0.00	0.00	0.00	3.00	9.00	10.00
0.00	0.00	25.00	4.50	8.20	30.00

GRASSES
Agropyron cristatum
Elymus cinereus
Hordeum jubatum
Stipa hymenoides

50.00	50.00	50.00	41.50	9.23
10.00	10.00	10.00	10.00	3.16
20.00	30.00	15.00	30.00	8.66
20.00	10.00	25.00	18.50	7.09

COVER
 Total Living Cover
 Litter
 Bareground
 Rock

40.00	50.00	40.00	48.38	31.02
0.00	0.00	0.00	0.00	0.00
60.00	50.00	60.00	51.62	31.02

% COMPOSITION
 Shrubs
 Forbs
 Grasses

PACIFICORP (ENERGY WEST)
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1998

SITE NAME: Beehive Substation Slope

AREA: Des-Bee-Dove (1986 Reveg. Area)

DATE: August 17-22, 1998

WORKERS: P. Collins, D. Collins

SLOPE: 35 deg.

EXPOSURE: S

AREA: .1 acre

ANIMAL USE/DISTURBANCE: Slight

EROSION: Slight erosion on some areas of the slope.

COVER: (see quantitative data)

DOMINANT PLANT SPECIES OBSERVED:

Atriplex confertifolia
Chrysothamnus nauseosus

Penstemon palmeri

Agropyron cristatum
Elymus lanceolatus
Elymus salinus
Elymus cinereus
Elymus hispidus
Stipa hymenoides

WOODY SPECIES DENSITY:	1997	(no./ac)	1998
<i>Chrysothamnus nauseosus</i>	5158.51		3484.80
<i>Atriplex confertifolia</i>	<u>224.28</u>		<u>232.32</u>
Total	5882.79		3717.12
 PRODUCTION:	 1997	 (lbs/ac)	 1998
Herbaceous	124.33		133.43
Woody	<u>489.15</u>		<u>618.21</u>
Total	613.48		751.64

- NOTES: 1) Sampled over entire slope.
- 2) Sampled cover (n=6) and frequency (n=) by ocular methods.
- 3) Sampled density (n=6) using 5'X25' belt transects.
- 4) Sampled productivity [n=6(30)] by clipping, weighing and double sampling.

ENERGY WEST-DES BEE DOVE

Beehive Substation Slope

1986 Reveg Area

Acreage: .1

Slope: 35 deg

Exposure: S

Sample Date: 17-22 Aug 98

	1.00	2.00	3.00	4.00	5.00	6.00	Mean
--	------	------	------	------	------	------	------

SHRUBS

<i>Atriplex confertifolia</i>	0.00	20.00	0.00	35.00	0.00	0.00	9.17
<i>Chrysothamnus nauseosus</i>	20.00	0.00	20.00	15.00	40.00	5.00	16.67

FORBS

<i>Penstemon palmeri</i>	5.00	0.00	0.00	0.00	0.00	0.00	0.83
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GRASSES

<i>Elymus hispidus</i>	0.00	0.00	0.00	10.00	20.00	0.00	5.00
<i>Elymus lanceolatus</i>	5.00	5.00	5.00	0.00	0.00	0.00	2.50
<i>Elymus salinus</i>	0.00	0.00	10.00	0.00	0.00	35.00	7.50
<i>Stipa hymenoides</i>	0.00	0.00	5.00	0.00	0.00	0.00	0.83

COVER

Total Living Cover	30.00	25.00	40.00	60.00	60.00	40.00	42.50
Litter	5.00	5.00	5.00	10.00	10.00	25.00	10.00
Bareground	30.00	55.00	25.00	5.00	10.00	20.00	24.17
Rock	35.00	15.00	30.00	25.00	20.00	15.00	23.33

% COMPOSITION

Shrubs	66.67	80.00	50.00	83.33	66.67	12.50	59.86
Forbs	16.67	0.00	0.00	0.00	0.00	0.00	2.78
Grasses	16.67	20.00	50.00	16.67	33.33	87.50	37.36

ENERGY WEST-DES BEE DOVE

Beehive Substation Slope

1986 Reveg Area

Acreage: .1

Slope: 35 deg

Exposure: S

Sample Date: 17-22 Aug 98

SDev	Freq	
<hr/>		
		SHRUBS
13.67	33.33	<i>Atriplex confertifolia</i>
12.80	83.33	<i>Chrysothamnus nauseosus</i>
		FORBS
1.86	16.67	<i>Penstemon palmeri</i>
		GRASSES
7.64	33.33	<i>Elymus hispidus</i>
2.50	50.00	<i>Elymus lanceolatus</i>
12.83	33.33	<i>Elymus salinus</i>
1.86	16.67	<i>Stipa hymenoides</i>
<hr/>		
		COVER
13.46		Total Living Cover
7.07		Litter
16.18		Bareground
7.45		Rock
<hr/>		
		% COMPOSITION
23.77		Shrubs
6.21		Forbs
25.32		Grasses
<hr/>		

PACIFICORP (ENERGY WEST)
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1998

SITE NAME: Sediment Pond Area

AREA: Des-Bee-Dove (1985 Reveg. Area)

DATE: August 10-15, 1998

WORKERS: P. Collins, D. Collins

SLOPE: 0-10 deg.

EXPOSURE: S

AREA: .7 acre

ANIMAL USE/DISTURBANCE: Negligible

EROSION: Negligible

COVER: (See quantitative data)

DOMINANT PLANT SPECIES OBSERVED: (see also quant. data sheet)

Atriplex canescens
Atriplex confertifolia
Chrysothamnus nauseosus
Chrysothamnus viscidiflorus
Gutierrezia sarothrae
Sarcobatus vermiculatus

Malcomia africana

Agropyron cristatum
Bromus tectorum
Elymus salinus
Elymus spicatus
Hilaria jamesii
Stipa hymenoides

WOODY SPECIES DENSITY: 1997
(no./ac)

<i>Chrysothamnus nauseosus</i>	518.81
<i>Atriplex canescens</i>	4669.27
<i>Sarcobatus vermiculatus</i>	518.81
<i>Atriplex confertifolia</i>	2075.23
<i>Gutierrezia sarothrae</i>	<u>12970.18</u>
Total	20752.29

PRODUCTION:	1997 (<u>lbs/ac</u>)
Herbaceous	77.04
Woody	<u>794.27</u>
Total	871.31

- NOTES: 1) We sampled qualitatively this year, but left the above 1997 quantitative data for future comparisons.
- 2) Site looked excellent.

PACIFICORP (ENERGY WEST)
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1998

SITE NAME: Bathhouse Slope

AREA: Des-Bee-Dove (1984 Reveg. Area)

DATE: August 17-22, 1998

WORKERS: P. Collins, D. Collins

SLOPE: 25 deg.

EXPOSURE: Variable

AREA: 2.3 acre

ANIMAL USE/DISTURBANCE: There is slight erosion in some areas.

EROSION: Negligible

COVER: Qualitative data only

DOMINANT PLANT SPECIES OBSERVED:

Atriplex canescens

Chrysothamnus nauseosus

Eriogonum corymbosum

Aster glaucodes

Sisymbrium altissimum

Agropyron cristatum

Elymus lanceolatus

Elymus smithii

Elymus salinus

Elymus hispidus

Elymus cinereus

Stipa hymenoides

- NOTES:
- 1) Sampled only qualitatively again this year.
 - 2) As before, this site was in "excellent" condition.
 - 3) Vegetative cover remains good & diverse.

PACIFICORP (ENERGY WEST)
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1998

SITE NAME: Materials Yard Slope

AREA: Des-Bee-Dove (1984 Reveg. Area)

DATE: August 17-22, 1998

WORKERS: P. Collins, D. Collins

SLOPE: 20-25 deg.

EXPOSURE: SE

AREA: 1.1 acre

ANIMAL USE/DISTURBANCE: Negligible

EROSION: Mostly negligible, but there was some moderate erosion near the bottom of the slope.

COVER: (qual, data only)

DOMINANT PLANT SPECIES OBSERVED:

Atriplex confertifolia

Atriplex gardneri

*Chrysothamnus nauseosus**

Aster chilensis

Bromus tectorum

Elymus cinereus

*Elymus lanceolatus**

*Elymus smithii**

Elymus spicatus

Stipa hymenoides

**dominants*

NOTES: 1) Sampled for qualitative data only this year.

2) Site looked "excellent" again this year.

PACIFICORP (ENERGY WEST)
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1998

SITE NAME: Test Plot (1989)

AREA: Des-Bee-Dove

DATE: August 10-15, 1998

WORKERS: P. Collins, D. Collins

SLOPE: 26 deg.

EXPOSURE: S

AREA: .6 acre

ANIMAL USE/DISTURBANCE: Negligible

EROSION: Slight to Moderate

COVER: (see quantitative data)

PLANT SPECIES PLANTED:

Atriplex canescens
Atriplex corrugata
Atriplex confertifolia
Ceratoides lanata
Kochia prostrata

Linum lewisii
Melilotus officinalis
Sphaeralcea coccinea

Elymus lanceolatus
Elymus smithii
Elymus cinereus
Stipa hymenoides
Sporobolus airoides

PLANT SPECIES OBSERVED:

Sarcobatus vermiculatus
Suaeda torreyana
Atriplex canescens
Atriplex gardneri
Atriplex confertifolia

Atriplex powellii
Bassia hyssopifolia
Kochia scoparia
Halogeton glomeratus

West Side

WOODY SPECIES DENSITY:	1998 (<u>no./ac</u>)
<i>Atriplex confertifolia</i>	311.37
<i>Atriplex gardneri</i>	103.79
<i>Atriplex canescens</i>	726.54
<i>Sarcobatus vermiculatus</i>	932.12
<i>Suaeda torreyana</i>	<u>2075.81</u>
Total	4151.63

PRODUCTION:	1998 (<u>lbs/ac</u>)
Herbaceous	0.00
Woody	<u>394.41</u>
Total	394.41

East Side

WOODY SPECIES DENSITY:	1998 (<u>no./ac</u>)
<i>Atriplex gardneri</i>	4.26
<i>Atriplex canescens</i>	7.10
<i>Sarcobatus vermiculatus</i>	18.47
<i>Suaeda torreyana</i>	<u>26.99</u>
Total	589.43

PRODUCTION:	1998 (<u>lbs/ac</u>)
Herbaceous	38.16
Woody	<u>0.00</u>
Total	38.16

- NOTES: 1) Sampled west side, then the east side.
- 2) Took 10 cover (n=10), frequency (n=10), density [pt. quarter (n=10)] and productivity [n=10(50)] samples on each side.
- 3) We placed a 200 ft transect on west side of each plot.
- 4) Sampled regularly along transect, then randomly to penetrate the plot.

UP&L-DES BEE DOVE

TEST PLOT (1989)

West Side

Acreage:

Slope: 26 deg

Exposure: S

Sample Date: 10-15 Aug 98

1.00 2.00 3.00 4.00 5.00 6.00 7.00

SHRUBS

<i>Atriplex confertifolia</i>	0.00	0.00	0.00	0.00	15.00	0.00	0.00
<i>Atriplex canescens</i>	0.00	0.00	0.00	5.00	0.00	20.00	0.00
<i>Suaeda torreyana</i>	25.00	25.00	30.00	0.00	0.00	0.00	8.00
<i>Sarcobatus vermiculatus</i>	0.00	0.00	0.00	0.00	0.00	10.00	2.00

FORBS

<i>Halogeton glomeratus</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00
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GRASSES

COVER

Total Living Cover	25.00	25.00	30.00	5.00	15.00	30.00	10.00
Litter	5.00	5.00	10.00	5.00	15.00	5.00	10.00
Bareground	60.00	60.00	55.00	80.00	65.00	60.00	70.00
Rock	10.00	10.00	5.00	10.00	5.00	5.00	10.00

% COMPOSITION

Shrubs	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Forbs	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grasses	0.00	0.00	0.00	0.00	0.00	0.00	0.00

UP&L-DES BEE DO
 TEST PLOT (1989)
 West Side
 Acreage:
 Slope: 26 deg
 Exposure: S
 Sample Date: 10-15

8.00	9.00	10.00	Mean	SDev	Freq	
<hr/>						SHRUBS
0.00	0.00	0.00	1.50	4.50	10.00	<i>Atriplex confertifolia</i>
0.00	0.00	0.00	2.50	6.02	20.00	<i>Atriplex canescens</i>
0.00	25.00	0.00	11.30	12.50	50.00	<i>Suaeda torreyana</i>
0.00	0.00	10.00	2.20	3.94	30.00	<i>Sarcobatus vermicul</i>
 						FORBS
5.00	0.00	0.00	0.50	1.50	10.00	<i>Halogeton glomeratu</i>

GRASSES

<hr/>						COVER
5.00	25.00	10.00	18.00	9.54		Total Living Cover
5.00	5.00	10.00	7.50	3.35		Litter
85.00	50.00	75.00	66.00	10.68		Bareground
5.00	20.00	5.00	8.50	4.50		Rock
<hr/>						% COMPOSITION
0.00	100.00	100.00	90.00	30.00		Shrubs
100.00	0.00	0.00	10.00	30.00		Forbs
0.00	0.00	0.00	0.00	0.00		Grasses
<hr/>						

PACIFICORP (ENERGY WEST)
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1998

SITE NAME: Test Plot (1992)

AREA: Des-Bee-Dove

DATE: August 10-15, 1998

WORKERS: P. Collins, D. Collins

SLOPE: 3-5 deg.

EXPOSURE: SW

ANIMAL USE/DISTURBANCE:

EROSION: Slight

COVER: (see quantitative data)

PLANT SPECIES OBSERVED

Ceratoides lanata

Atriplex powellii

Kochia scoparia

Malcomia africana

Melilotus officinalis

Bassia hyssopifolia

Halogeton glomeratus

Stipa hymenoides

Bromus tectorum

Elymus lanceolatus

Elymus smithii

Elymus trachycaulus

Elymus cinereus

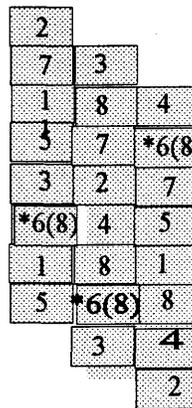
Elymus salinus

Sitanion hystrix

Stipa hymenoides

- NOTES: 1) Plot and trends looked the same this year. **See recently written Executive Summary that compares all years.**
- 2) I left the sample techniques below to remind us when we are there again.
- 3) As all previous years, we did not look at treatments before sampling as an attempt to decrease bias.
- 4) For cover we put 3 quadrats (n=3, tot. n=72) in each 10' X 14' plot, side by side leaving the edges for a buffer. Therefore, nearly the entire plot was sampled.
- 5) For density we counted all within each plot.
- 6) Refer to the map for the order.

NORTH



1. Rocky Soil
2. Coal Waste
3. Live Earth
4. Rocky Soil & Live Earth
5. Coal Waste & Live Earth
6. Sewage Slud.
7. Native Seed

UP&L-DES BEE DOVE
TEST PLOT (1989)

East Side

Acreeage:

Slope: 26 deg

Exposure: S

Sample Date: 10-15 Aug 98

1.00 2.00 3.00 4.00 5.00 6.00 7.00

SHRUBS

Atriplex gardneri

0.00 0.00 0.00 0.00 0.00 1.00 0.00

Suaeda torreyana

1.00 0.00 0.00 0.00 0.00 0.00 0.00

FORBS

Halogeton glomeratus

0.00 1.00 1.00 1.00 1.00 0.00 0.00

Kochia scoparia

0.00 0.00 0.00 0.00 0.00 0.00 5.00

GRASSES

COVER

Total Living Cover

1.00 1.00 1.00 1.00 1.00 1.00 5.00

Litter

4.00 5.00 5.00 5.00 5.00 5.00 5.00

Bareground

90.00 90.00 90.00 85.00 85.00 85.00 70.00

Rock

5.00 4.00 4.00 9.00 9.00 9.00 20.00

% COMPOSITION

Shrubs

100.00 0.00 0.00 0.00 0.00 100.00 0.00

Forbs

0.00 100.00 100.00 100.00 100.00 0.00 100.00

Grasses

0.00 0.00 0.00 0.00 0.00 0.00 0.00

UP&L-DES BEE DO
 TEST PLOT (1989)
 East Side
 Acreage:
 Slope: 26 deg
 Exposure: S
 Sample Date: 10-15

8.00	9.00	10.00	Mean	SDev	Freq
0.00	0.00	0.00	0.10	0.30	10.00
3.00	0.00	0.00	0.40	0.92	20.00

SHRUBS
Atriplex gardneri
Suaeda torreyana

0.00	5.00	5.00	1.40	1.85	60.00
0.00	0.00	0.00	0.50	1.50	10.00

FORBS
Halogeton glomeratu
Kochia scoparia

GRASSES

3.00	5.00	5.00	2.40	1.80
5.00	5.00	10.00	5.40	1.56
75.00	75.00	75.00	82.00	7.14
17.00	15.00	10.00	10.20	5.23

COVER
 Total Living Cover
 Litter
 Bareground
 Rock

100.00	0.00	0.00	30.00	45.83
0.00	100.00	100.00	70.00	45.83
0.00	0.00	0.00	0.00	0.00

% COMPOSITION
 Shrubs
 Forbs
 Grasses

COLOR
PHOTOGRAPHS



Des Bee Dove - Beehive Yard Slope



Des Bee Dove - Beehive Road Berm



Des Bee Dove - Deseret Road Berm



Des Bee Dove - Portal Road Berm



Des Bee Dove - Bathhouse Road Berm



Des Bee Dove - Tipple Slope



Des Bee Dove - Sediment Storage Slope



Des Bee Dove - Sediment Pond Banks



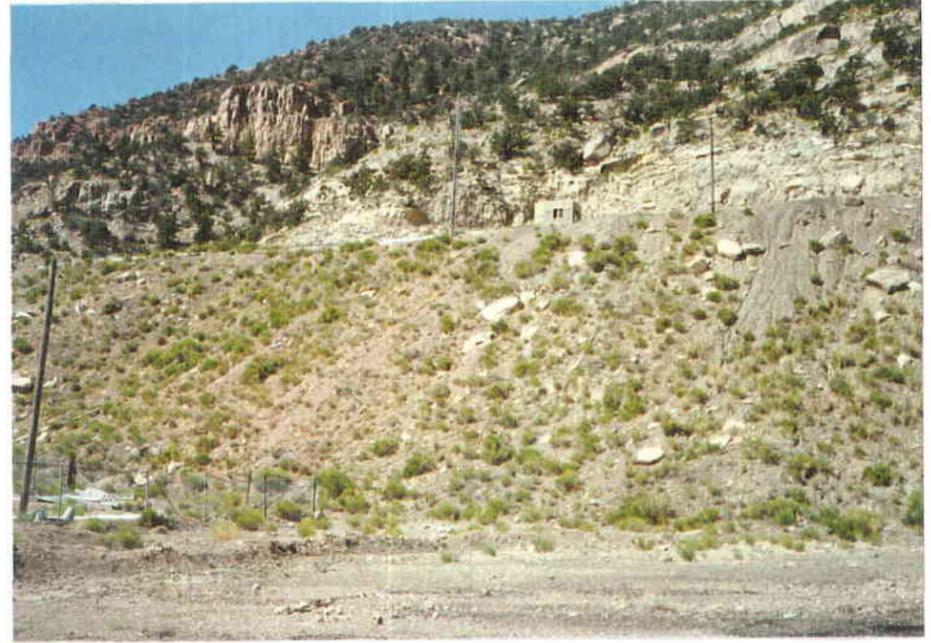
Des Bee Dove - Haul Road Bench



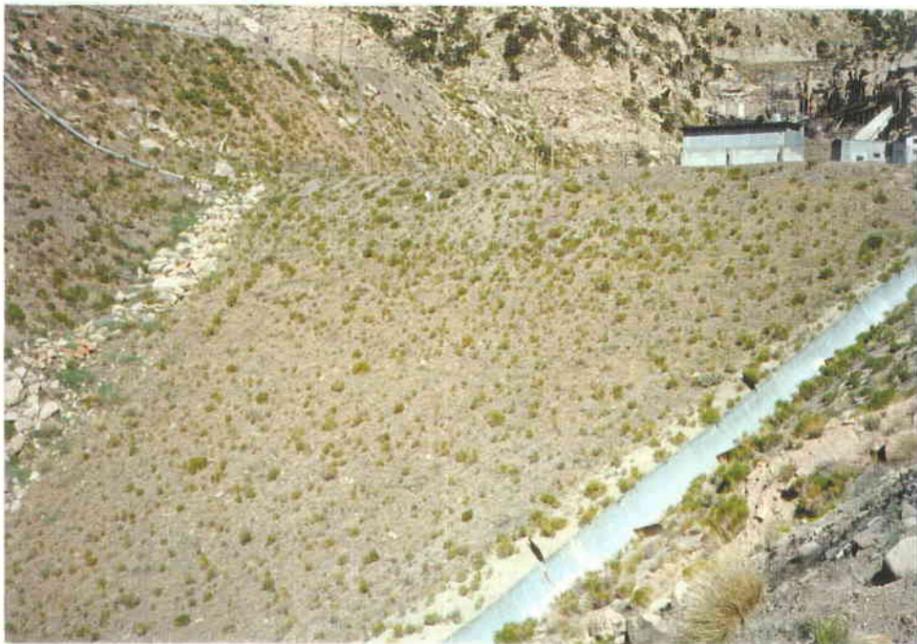
Des Bee Dove - Beehive Substation Slope



Des Bee Dove - Sediment Pond Area



Des Bee Dove - Bathhouse Slope



Des Bee Dove - Material Yard Slope



Des Bee Dove - Test Plot '89



Des Bee Dove - Test Plot '92

DEER CREEK AREA

PACIFICORP (ENERGY WEST)
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1998

SITE NAME: Riparian Areas

AREA: Deer Creek Mine Area

DATE: August 3-7, 1998

WORKERS: P. Collins

SLOPE: 1 to 5 deg.

EXPOSURE: Variable

AREA: < .5 acre

ANIMAL USE/DISTURBANCE: Negligible

EROSION: Negligible

COVER: (see quantitative data)

DOMINANT PLANT SPECIES OBSERVED: (see also quantitative data)

Clematis sp.
Rosa woodsii
Prunus virginiana
Chrysothamnus nauseosus
Sambucus caerulea

Aster chilensis
Medicago sativa
Cirsium sp.
Machaeranthera canescens

Agropyron cristatum
Elymus elongatus
Elymus cinereus
Elymus hispidus
Elymus spicatus
Stipa hymenoides
Poa pratensis

- NOTES: 1) Qualitative data only again this year.
- 2) The south area is across from the transfer site.
- 3) Both areas were < 10% weeds this year.
- 4) To locate, there is an opening just north of the riparian area (.4 mi. from coal storage road turn off) on the west side of the road.
- 5) Site looked excellent, nearly weed free now.

PACIFICORP (ENERGY WEST)
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1998

SITE NAME: Sediment Pond Dam

AREA: Deer Creek Mine Area

DATE: August 3-7, 1998

WORKERS: P. Collins, D. Collins

SLOPE: 1 - 25 deg.

EXPOSURE: Variable

AREA: < 2 acres

ANIMAL USE/DISTURBANCE: Negligible

EROSION: Negligible

COVER: (qualitative data only)

DOMINANT PLANT SPECIES OBSERVED:

Chrysothamnus nauseosus
Eriogonum corymbosum

Aster foliaceus
Grindelia squarrosa
Kochia scoparia
Halogeton glomeratus
Penstemon palmeri

Elymus smithii
Elymus cinereus
Elymus lanceolatus
Hordeum jubatum
Stipa hymenoides

- NOTES: 1) Qualitative data
- 2) Pond has been disturbed by modifications to it.
- 3) It appears to be even more disturbed in 1998 with only a few desirable spp. growing on the north end. The remaining area is comprised mostly of "weedy" spp.
- 4) The dam slope are large boulders with no space for vegetation.

PACIFICORP (ENERGY WEST)
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1998

SITE NAME: Temp. Sediment Basin

AREA: Deer Creek Mine Area

DATE: August 3-7, 1998

WORKERS: P. Collins

SLOPE: 1-2 deg.

EXPOSURE: Variable

AREA: < 1 acre.

ANIMAL USE/DISTURBANCE: Negligible

EROSION: Negligible

COVER: (qualitative data only)

DOMINANT PLANT SPECIES OBSERVED:

Cercocarpus ledifolius
Chrysothamnus nauseosus
Populus angustifolia

Aster chilensis
Grindelia squarrosa
Medicago sativa
Melilotus officinalis
Penstemon palmeri

Elymus cinereus
Stipa hymenoides
Elymus spicatus
Elymus smithii
Elymus lanceolatus
Hordeum jubatum

NOTES: 1) As mentioned last year, there was a good representation of desirable and less weedy spp. The site appears to be improving over time.

PACIFICORP (ENERGY WEST)
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1998

SITE NAME: Roadside Areas

AREA: Deer Creek (1990 Reveg. Area)

DATE: August 3-7, 1998

WORKERS: P. Collins

SLOPE: 5 deg.

EXPOSURE: NE

AREA: < 1 acre

ANIMAL USE/DISTURBANCE: Negligible

EROSION: Nearly negligible.

COVER: (qualitative data only)

DOMINANT PLANT SPECIES OBSERVED:

Aster chilensis
Grindelia squarrosa
Brickellia microphylla
Eriogonum corymbosum
Chrysothamnus nauseosus

Grindelia squarrosa
Medicago sativa

Bromus japonicus
Elymus junceus
Elymus spicatus
Elymus smithii
Elymus lanceolatus
Elymus cinereus
Hordeum jubatum
Stipa hymenoides

- NOTES: 1) Sampled east and west side of the road for qualitative data.
2) Mostly desirable species again this year.
3) Good diversity of grasses, but not many shrubs.
4) Good revegetation techniques here with very rough surface. Vegetation was growing in the "valleys" of this rough surface.

PACIFICORP (ENERGY WEST)
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1998

SITE NAME: Gate Area Slope

AREA: Deer Creek (1990 Reveg. Area)

DATE: August 3-7, 1998

WORKERS: P. Collins

SLOPE: 20 deg.

EXPOSURE: E

ANIMAL USE/DISTURBANCE: Negligible

EROSION: Still some erosion this, but considering the angle of
the slope, it's not bad.

COVER: (qualitative data only)

DOMINANT PLANT SPECIES OBSERVED:
Chrysothamnus nauseosus

Aster chilensis
Astragalus cicer
Grindelia squarrosa
Medicago sativa

Elymus cinereus
Elymus lanceolatus
Elymus spicatus
Elymus smithii
Stipa hymenoides

NOTES: 1) Qualitative data only. Site looks in good condition
considering the slope angle.

PACIFICORP (ENERGY WEST)
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1998

SITE NAME: Fan Road Slopes
AREA: Deer Creek (1989 Reveg. Area)
DATE: 3-7 August, 1998
WORKERS: P. Collins, D. Collins
SLOPE: Variable
EXPOSURE: Variable
AREA: 1.1 acres
ANIMAL USE/DISTURBANCE: Negligible
EROSION: Negligible
COVER: (qualitative only this year)

DOMINANT PLANT SPECIES OBSERVED:

Chrysothamnus nauseosus

Aster chilensis

Melilotus officinalis

Salsola pestifer

Agropyron cristatum

Bromus tectorum

Elymus lanceolatus

Elymus smithii

Elymus spicatus

Elymus salinus

Elymus cinereus

Hordeum jubatum

Sitanion hystrix

Stipa hymenoides

WOODY SPECIES DENSITY:	1998 (no./ac)
<i>Chrysothamnus nauseosus</i>	48.38
<i>Ribes aureum</i>	1.27
<u><i>Sambucus caerulea</i></u>	<u>1.27</u>
Total	50.92

PRODUCTION:	1998 (lbs/ac)
Herbaceous	944.61
Woody	<u>0.00</u>
Total	944.61

- NOTES: 1) Area and species diversity looked good. Similar species observed as noted last year.
- 2) Sampled cover (n=10) and frequency (n=10) by ocular methods.
- 3) Sampled density (n=10) by point quarter method.
- 4) Sampled productivity [n=10(50)] by clipping, weighing and double sampling.
- 5) There were very few woody species here.
- 6) By the way the map looked, we considered everything on the south side of road (left as you walk up) the Fan Road Slopes.

UP&L-DEER CREEK

Fan Road Slopes

1989 Reveg Area

Acreage: 1.1

Slope: variable

Exposure: variable

Sample Date: 3-7 Aug 98

1.00 2.00 3.00 4.00 5.00 6.00 7.00

SHRUBS

FORBS

Aster chilensis 5.00 55.00 60.00 30.00 15.00 20.00 25.00

GRASSES

Agropyron cristatum 25.00 0.00 0.00 0.00 0.00 0.00 0.00
Elymus cinereus 0.00 0.00 0.00 0.00 25.00 0.00 0.00
Elymus lanceolatus 0.00 10.00 5.00 10.00 5.00 0.00 0.00
Elymus salinus 0.00 0.00 0.00 0.00 0.00 0.00 0.00
Elymus smithii 10.00 0.00 0.00 10.00 0.00 10.00 0.00
Elymus spicatus 0.00 0.00 0.00 0.00 0.00 0.00 25.00
Hordeum jubatum 0.00 5.00 0.00 0.00 0.00 0.00 0.00
Stipa hymenoides 10.00 0.00 0.00 0.00 0.00 0.00 0.00

COVER

Total Living Cover 50.00 70.00 65.00 50.00 45.00 30.00 50.00
Litter 10.00 5.00 10.00 10.00 15.00 5.00 10.00
Bareground 30.00 20.00 5.00 10.00 15.00 10.00 10.00
Rock 10.00 5.00 20.00 30.00 25.00 55.00 30.00

% COMPOSITION

Shrubs 0.00 0.00 0.00 0.00 0.00 0.00 0.00
Forbs 10.00 78.57 92.31 60.00 33.33 66.67 50.00
Grasses 90.00 21.43 7.69 40.00 66.67 33.33 50.00

UP&L-DEER CREE
 Fan Road Slopes
 1989 Reveg Area
 Acreage: 1.1
 Slope: variable
 Exposure: variable
 Sample Date: 3-7 Au

8.00	9.00	10.00	Mean	SDev	Freq	
<hr/>						SHRUBS
20.00	50.00	20.00	30.00	17.61	100.00	FORBS <i>Aster chilensis</i>
0.00	0.00	20.00	4.50	9.07	20.00	GRASSES <i>Agropyron cristatum</i>
0.00	30.00	0.00	5.50	11.06	20.00	<i>Elymus cinereus</i>
15.00	0.00	10.00	5.50	5.22	60.00	<i>Elymus lanceolatus</i>
0.00	0.00	10.00	1.00	3.00	10.00	<i>Elymus salinus</i>
10.00	0.00	0.00	4.00	4.90	40.00	<i>Elymus smithii</i>
5.00	0.00	0.00	3.00	7.48	20.00	<i>Elymus spicatus</i>
0.00	0.00	0.00	0.50	1.50	10.00	<i>Hordeum jubatum</i>
0.00	0.00	0.00	1.00	3.00	10.00	<i>Stipa hymenoides</i>
<hr/>						COVER
50.00	80.00	60.00	55.00	13.42		Total Living Cover
10.00	10.00	10.00	9.50	2.69		Litter
5.00	5.00	5.00	11.50	7.76		Bareground
35.00	5.00	25.00	24.00	14.46		Rock
<hr/>						% COMPOSITION
0.00	0.00	0.00	0.00	0.00		Shrubs
40.00	62.50	33.33	52.67	23.07		Forbs
60.00	37.50	66.67	47.33	23.07		Grasses

PACIFICORP (ENERGY WEST)
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1998

SITE NAME: Refuse Pile & Berm

AREA: Deer Creek (1988 Reveg. Area)

DATE: August 3-7, 1998

WORKERS: P. Collins, D. Collins

SLOPE: 27 deg.

EXPOSURE: NE 300 deg.

AREA: 4.0 acres

ANIMAL USE/DISTURBANCE: Negligible

EROSION: Negligible in most areas, but moderate in the areas
with sparse vegetation.

COVER: (see quantitative data)

DOMINANT PLANT SPECIES OBSERVED:

Chrysothamnus nauseosus
Chrysothamnus viscidiflorus
Eriogonum corymbosum

Aster chilensis
Halogeton glomeratus
Machaeranthera canescens
Medicago sativa
Penstemon palmeri
Salsola pestifer

Agropyron cristatum
Bromus inermis
Elymus lanceolatus
Elymus smithii
Elymus spicatus
Elymus cinereus
Hordeum jubatum
Stipa hymenoides

Page 2
 Refuse Pile & Berm

WOODY SPECIES DENSITY:	1997	(no./ac)	1998
<i>Chrysothamnus nauseosus</i>	1583.61		1481.29
<i>Eriogonum corymbosum</i>	<u>1339.98</u>		<u>888.78</u>
Total	2923.59		2370.07
PRODUCTION:	1997	(lbs/ac)	1998
Herbaceous	323.84		499.31
Woody	<u>278.53</u>		<u>254.80</u>
Total	602.37		754.11

- NOTES: 1) We sampled whole area randomly. Samples 1-10 were on the Refuse Pile and 11-12 were on the berm.
- 2) Sampled cover (n=12) and frequency (n=12) by ocular methods.
- 3) Sampled density (n=12) using to pt. quarter method.
- 4) Sampled productivity [n=12(60)] by clipping, weighing and double sampling.
- 5) Like previous years, patchy areas of weeds and some of desirable species.

ENERGY WEST-DEER CREEK

Refuse Pile & Berm

1988 Reveg Area

Acreage: 4.0 acres

Slope: 27 deg

Exposure: NE (300 deg)

Sample Date: 3-7 Aug 98

	1.00	2.00	3.00	4.00	5.00	6.00	7.00
--	------	------	------	------	------	------	------

SHRUBS

<i>Chrysothamnus nauseosus</i>	0.00	20.00	5.00	10.00	15.00	0.00	15.00
<i>Eriogonum corymbosum</i>	0.00	0.00	5.00	0.00	0.00	10.00	10.00

FORBS

<i>Aster chilensis</i>	0.00	0.00	25.00	15.00	15.00	0.00	0.00
<i>Penstemon palmeri</i>	0.00	0.00	0.00	0.00	0.00	5.00	0.00

GRASSES

<i>Bromus inermis</i>	0.00	0.00	0.00	0.00	5.00	5.00	10.00
<i>Elymus cinereus</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Elymus lanceolatus</i>	10.00	5.00	0.00	5.00	10.00	30.00	10.00
<i>Elymus smithii</i>	0.00	0.00	0.00	5.00	0.00	0.00	0.00
<i>Elymus spicatus</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Hordeum jubatum</i>	15.00	0.00	0.00	0.00	5.00	0.00	5.00
<i>Stipa hymenoides</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00

COVER

Total Living Cover	25.00	25.00	35.00	35.00	50.00	50.00	50.00
Litter	10.00	10.00	10.00	10.00	10.00	15.00	10.00
Bareground	15.00	15.00	10.00	15.00	15.00	15.00	15.00
Rock	50.00	50.00	45.00	40.00	25.00	20.00	25.00

% COMPOSITION

Shrubs	0.00	80.00	28.57	28.57	30.00	20.00	50.00
Forbs	0.00	0.00	71.43	42.86	30.00	10.00	0.00
Grasses	100.00	20.00	0.00	28.57	40.00	70.00	50.00

8.00	9.00	10.00	11.00	12.00	Mean	SDev	Freq
10.00	0.00	0.00	0.00	15.00	7.50	7.22	58.33
0.00	0.00	5.00	0.00	0.00	2.50	3.82	33.33
15.00	0.00	10.00	10.00	5.00	7.92	8.03	58.33
10.00	10.00	5.00	0.00	0.00	2.50	3.82	33.33
0.00	0.00	0.00	0.00	0.00	1.67	3.12	25.00
0.00	30.00	10.00	25.00	0.00	5.42	10.30	25.00
0.00	10.00	10.00	0.00	10.00	8.33	7.73	75.00
0.00	0.00	0.00	0.00	5.00	0.83	1.86	16.67
0.00	0.00	0.00	5.00	0.00	0.42	1.38	8.33
0.00	0.00	0.00	0.00	0.00	2.08	4.31	25.00
0.00	0.00	10.00	10.00	15.00	2.92	5.19	25.00
35.00	50.00	50.00	50.00	50.00	42.08	9.89	Total Living Cover
5.00	10.00	10.00	10.00	15.00	10.42	2.47	litter
15.00	15.00	10.00	15.00	15.00	14.17	1.86	bareground
45.00	25.00	30.00	25.00	20.00	33.33	11.24	Rock
28.57	0.00	10.00	0.00	30.00	25.48	22.10	Shrubs
71.43	20.00	30.00	20.00	10.00	25.48	24.24	forbs
0.00	80.00	60.00	80.00	60.00	49.05	30.75	grasses

ENERGY WEST-DEER CREEK

Refuse Pile & Berm

1988 Reveg Area

Acreage: 4.0 acres

Slope: 27 deg

Exposure: NE (300 deg)

Sample Date: 3-7 Aug 98

SHRUBS

Chrysothamnus nauseosus

Eriogonum corymbosum

FORBS

Aster chilensis

Penstemon palmeri

GRASSES

Bromus inermis

Elymus cinereus

Elymus lanceolatus

Elymus smithii

Elymus spicatus

Hordeum jubatum

Stipa hymenoides

COVER

Total Living Cover

Litter

Bareground

Rock

% COMPOSITION

Shrubs

Forbs

Grasses

PACIFICORP (ENERGY WEST)
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1998

SITE NAME: Rock Slide and Berm

AREA: Deer Creek

DATE: August 3-7, 1998

WORKERS: P. Collins, D. Collins

SLOPE: 53+ deg.

EXPOSURE: W

AREA: .5 acre

ANIMAL USE/DISTURBANCE: Negligible

EROSION: Negligible

COVER: Cover was estimated by nonconventional methods
because of steep and dangerous slopes (see quant.
data).

DOMINANT PLANT SPECIES OBSERVED:

Chrysothamnus nauseosus
Eriogonum corymbosum

Aster chilensis
Halogeton glomeratus
Malcomia africana

Agropyron cristatum
Elymus smithii
Elymus lanceolatus
Elymus cinereus
Elymus spicatus

WOODY SPECIES DENSITY: 1998
(no./ac)

<i>Chrysothamnus nauseosus</i>	59.57
<i>Eriogonum corymbosum</i>	<u>297.86</u>
Total	357.43

PRODUCTION:	1998
	(<u>lbs/ac</u>)
Herbaceous	333.98
Woody	<u>2.96</u>
Total	336.94

- NOTES: 1) Methods: As mentioned above, for cover, (because of dangerously steep slopes) we had to make estimations by viewing from a distance
- 2) Sampled cover (n=10) and frequency (n=10) by ocular methods.
- 3) Sampled density using pt. quarter method (n=6).
- 4) Sampled productivity [n=5(25)] by clipping, weighing and double sampling.
- 5) Samples 1-5 was on the berm, 6-10 were on the slide(n=10).
- 6) Due to dangerous nature of the slide area we could not record production or woody species density on it, but we did do production on the berm.
- 7) The vegetative cover is sparse where erosion repair work has been implemented.
- 8) The steep slide area appears to have constant erosion problems.
- 9) Density methods may not be as accurate as they should because of the narrow berm (I was using pt. quarter, the tried "nearest neighbor").
- 10) Berm has some severe erosion with bare soil and no vegetation.

ENERGY WEST-DEER CREEK

Rock Slide and Berm

1988 Reveg Area

Acreage: .5 deg

Slope: 53+ deg

Exposure: W

Sample Date: 3-7 Aug 98

1.00 2.00 3.00 4.00 5.00 6.00 7.00

SHRUBS

Eriogonum corymbosum 0.00 0.00 0.00 5.00 0.00 0.00 0.00

FORBS

Aster chilensis 0.00 0.00 5.00 0.00 5.00 0.00 0.00

GRASSES

Elymus cinereus 0.00 0.00 0.00 0.00 20.00 15.00 0.00

Elymus lanceolatus 0.00 5.00 25.00 10.00 5.00 10.00 10.00

Elymus smithii 10.00 0.00 0.00 10.00 20.00 0.00 0.00

Elymus spicatus 0.00 5.00 10.00 10.00 0.00 0.00 0.00

Total Living Cover 10.00 10.00 40.00 35.00 50.00 25.00 10.00

Litter 10.00 10.00 10.00 5.00 10.00 5.00 5.00

Bareground 70.00 60.00 15.00 10.00 35.00 45.00 60.00

Rock 10.00 20.00 35.00 50.00 5.00 25.00 25.00

% COMPOSITION

Shrubs 0.00 0.00 0.00 14.29 0.00 0.00 0.00

Forbs 0.00 0.00 12.50 0.00 10.00 0.00 0.00

Grasses 100.00 100.00 87.50 85.71 90.00 100.00 100.00

ENERGY WEST-DE
 Rock Slide and Ber
 1988 Reveg Area
 Acreage: .5 deg
 Slope: 53+ deg
 Exposure: W
 Sample Date: 3-7 A

8.00	9.00	10.00	Mean	SDev	Freq	
0.00	0.00	0.00	0.50	1.50	10.00	SHRUBS <i>Eriogonum corymbo</i>
5.00	10.00	0.00	2.50	3.35	40.00	FORBS <i>Aster chilensis</i>
0.00	0.00	0.00	3.50	7.09	20.00	GRASSES <i>Elymus cinereus</i>
0.00	0.00	5.00	7.00	7.14	70.00	<i>Elymus lanceolatus</i>
0.00	10.00	0.00	5.00	6.71	40.00	<i>Elymus smithii</i>
0.00	0.00	0.00	2.50	4.03	30.00	<i>Elymus spicatus</i>
5.00	20.00	5.00	21.00	15.13		Total Living Cover
5.00	10.00	5.00	7.50	2.50		Litter
65.00	60.00	60.00	48.00	20.15		Bareground
25.00	10.00	30.00	23.50	12.66		Rock
0.00	0.00	0.00	1.43	4.29		% COMPOSITION Shrubs
100.00	50.00	0.00	17.25	31.27		Forbs
0.00	50.00	100.00	81.32	30.78		Grasses

PACIFICORP (ENERGY WEST)
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1998

SITE NAME: Water Plant Slope

AREA: Deer Creek (1988 Reveg. Area)

DATE: August 4-7, 1998

WORKERS: P. Collins, D. Collins

SLOPE: 38 deg.

EXPOSURE: NE, 320

ANIMAL USE/DISTURBANCE:

EROSION: Slight

COVER: (see quantitative data)

DOMINANT PLANT SPECIES OBSERVED: (see also quantitative data)

Artemisia tridentata
Chrysothamnus nauseosus
Eriogonum corymbosum

Aster chilensis
Machaeranthera canescens
Medicago sativa
Melilotus officinalis
Penstemon palmeri

Agropyron cristatum
Elymus cinereus
Elymus lanceolatus
Elymus salinus
Elymus smithii
Elymus spicatus
Elymus hymenoides
Hordeum jubatum
Sitanion hystrix

WOODY SPECIES DENSITY:	1997	1998
	<u>(no./ac)</u>	
<i>Amalanchier utahensis</i>		13.99
<i>Chrysothamnus nauseosus</i>	414.71	517.66
<i>Rosa woodsii</i>	13.41	13.99
<i>Eriogonum corymbosum</i>	<u>107.28</u>	<u>13.99</u>
Total	3328.68	559.63

PRODUCTION:	1997	1998
	<u>(lbs/ac)</u>	
Herbaceous	372.38	623.42
Woody	<u>47.56</u>	<u>101.01</u>
Total	419.94	724.43

NOTES:

- 1) We sampled randomly on slopes.
- 2) Sampled cover (n=10) and frequency (n=10) by ocular methods.
- 3) Sampled density (n=10) using the pt. quarter methods.
- 4) Sampled productivity [n=10(50)] by clipping, weighing and double sampling.
- 5) Unlike previous years, and by the way the map looked this year, we considered everything on the north side of the road (rt. as one walks up) to be the Water Plant Slopes.
- 6) Some areas had a fair representation of woody species while other area did not have much.

ENERGY WEST-DEER CREEK

Water Plant Slope

1988 Reveg Area

Acreage:

Slope: 38 deg

Exposure: NE (320 deg)

Sample Date: 3-7 Aug 98

	1.00	2.00	3.00	4.00	5.00	6.00	7.00
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SHRUBS

<i>Chrysothamnus nauseosus</i>	0.00	0.00	0.00	0.00	0.00	0.00	10.00
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FORBS

<i>Aster chilensis</i>	45.00	5.00	10.00	5.00	15.00	5.00	0.00
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<i>Medicago sativa</i>	0.00	0.00	0.00	5.00	0.00	0.00	0.00
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<i>Melilotus officinalis</i>	0.00	15.00	5.00	5.00	0.00	0.00	0.00
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GRASSES

<i>Agropyron cristatum</i>	0.00	0.00	0.00	0.00	0.00	0.00	5.00
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<i>Elymus cinereus</i>	5.00	0.00	0.00	0.00	0.00	10.00	0.00
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<i>Elymus junceus</i>	0.00	0.00	5.00	0.00	0.00	0.00	0.00
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<i>Elymus lanceolatus</i>	5.00	10.00	10.00	5.00	15.00	0.00	0.00
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<i>Elymus salinus</i>	0.00	0.00	0.00	0.00	0.00	0.00	5.00
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<i>Elymus smithii</i>	5.00	0.00	0.00	0.00	0.00	0.00	0.00
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<i>Elymus spicatus</i>	0.00	0.00	5.00	25.00	10.00	15.00	20.00
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<i>Hordeum jubatum</i>	0.00	0.00	0.00	0.00	0.00	10.00	0.00
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<i>Stipa hymenoides</i>	10.00	0.00	0.00	0.00	0.00	0.00	0.00
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COVER

Total Living Cover	70.00	30.00	35.00	45.00	40.00	40.00	40.00
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Litter	10.00	5.00	10.00	10.00	10.00	10.00	10.00
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Bareground	10.00	10.00	20.00	20.00	30.00	5.00	10.00
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Rock	10.00	55.00	35.00	25.00	20.00	45.00	40.00
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% COMPOSITION

Shrubs	0.00	0.00	0.00	0.00	0.00	0.00	25.00
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Forbs	64.29	66.67	42.86	33.33	37.50	12.50	0.00
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Grasses	35.71	33.33	57.14	66.67	62.50	87.50	75.00
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ENERGY WEST-DE
 Water Plant Slope
 1988 Reveg Area
 Acreage:
 Slope: 38 deg
 Exposure: NE (320
 Sample Date: 3-7 Au

8.00	9.00	10.00	Mean	SDev	Freq	
15.00	10.00	0.00	3.50	5.50	30.00	SHRUBS <i>Chrysothamnus nau</i>
10.00	10.00	5.00	11.00	12.00	90.00	FORBS <i>Aster chilensis</i>
0.00	0.00	0.00	0.50	1.50	10.00	<i>Medicago sativa</i>
0.00	0.00	0.00	2.50	4.61	30.00	<i>Melilotus officinalis</i>
10.00	0.00	0.00	1.50	3.20	20.00	GRASSES <i>Agropyron cristatum</i>
5.00	15.00	25.00	6.00	8.00	50.00	<i>Elymus cinereus</i>
0.00	0.00	0.00	0.50	1.50	10.00	<i>Elymus junceus</i>
0.00	5.00	20.00	7.00	6.40	70.00	<i>Elymus lanceolatus</i>
0.00	0.00	0.00	0.50	1.50	10.00	<i>Elymus salinus</i>
0.00	0.00	0.00	0.50	1.50	10.00	<i>Elymus smithii</i>
10.00	0.00	20.00	10.50	8.79	70.00	<i>Elymus spicatus</i>
0.00	0.00	0.00	1.00	3.00	10.00	<i>Hordeum jubatum</i>
0.00	0.00	0.00	1.00	3.00	10.00	<i>Stipa hymenoides</i>
50.00	40.00	70.00	46.00	13.00		COVER Total Living Cover
10.00	10.00	20.00	10.50	3.50		Litter
15.00	10.00	5.00	13.50	7.43		Bareground
25.00	40.00	5.00	30.00	15.00		Rock
30.00	25.00	0.00	8.00	12.29		% COMPOSITION Shrubs
20.00	25.00	7.14	30.93	21.44		Forbs
50.00	50.00	92.86	61.07	19.00		Grasses

PACIFICORP (ENERGY WEST)
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1998

SITE NAME: Pipeline

AREA: Deer Creek (1986 Reveg. Area)

DATE: August 3-7, 1998

WORKERS: P. Collins

SLOPE: 5 - 30 deg.

EXPOSURE: Variable

AREA: 3.5 acre

ANIMAL USE/DISTURBANCE: Negligible

EROSION: Negligible

COVER: (see quantitative data)

DOMINANT PLANT SPECIES OBSERVED: (see also quantitative data)

Artemisia tridentata
Chrysothamnus nauseosus
Eriogonum corymbosum
Gutierrezia sarothrae
Juniperus osteosperma
Pinus edulis
Populus angustifolia
Salix sp.

Artemisia dracunculus
Aster chilensis
Aster foliaceus
Castilleja sp.
Grindelia squarrosa
Halogeton glomeratus
Kochia scoparia
Machaeranthera canescens
Malcomia africana
Medicago sativa
Melilotus officinalis
Penstemon palmeri
Salsola pestifer

Elymus cinereus
Bromus tectorum
Elymus lanceolatus
Elymus spicatus
Agropyron cristatum
Elymus hispidus
Bromus tectorum
Elymus cinereus
Stipa hymenoides
Hordeum jubatum

WOODY SPECIES DENSITY:	1997	1998
	(<u>no./ac</u>)	
<i>Atriplex confertifolia</i>		34.68
<i>Brickellia microphylla</i>	199.19	
<i>Chrysothamnus nauseosus</i>	1314.66	1317.66
<i>Eriogonum corymbosum</i>	318.71	34.68
<i>Gutierrezia sarothrae</i>	39.84	69.35
<i>Juniperus osteosperma</i>	119.51	
<i>Pseudotsuga menziesii</i>	39.84	34.68
<i>Rhus trilobata</i>	<u>39.84</u>	<u>69.35</u>
Total	2071.59	1803.10

PRODUCTION:	1997	1998
	(<u>lbs/ac</u>)	
Herbaceous	389.24	616.01
Woody	<u>383.40</u>	<u>547.18</u>
Total	772.64	1163.19

- NOTES: 1) We sampled at regular intervals over the length of the pipeline at approx. every .10 mile.
- 2) Sampled cover (n=13) and frequency (n=13) by ocular methods.
- 3) Sampled density (n=13) using the pt quarter method.
- 4) Sampled productivity [n=13(65)] by clipping, weighing and double sampling.
- 5) This year they appeared to be only about 10%.
- 6) We sampled to the top near the facilities area again this year.
- 7) There were patchy areas of weeds when the pipeline went near the main road, probably due to road salt.

ENERGY WEST-DEER CREEK

Pipeline

1986 Reveg Site

Acreage: 3.5 acres

Slope: 5-30 deg

Exposure: variable

Sample Date: 3-7 Aug 98

	1.00	2.00	3.00	4.00	5.00	6.00	7.00
SHRUBS							
<i>Atriplex confertifolia</i>	0.00	10.00	0.00	0.00	0.00	0.00	0.00
<i>Chrysothamnus nauseosus</i>	20.00	0.00	65.00	0.00	5.00	45.00	20.00
<i>Eriogonum corymbosum</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Gutierrezia sarothrae</i>	25.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Pseudotsuga menziesii</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FORBS							
<i>Aster chilensis</i>	0.00	0.00	0.00	0.00	0.00	0.00	10.00
<i>Grindelia squarrosa</i>	0.00	0.00	0.00	0.00	0.00	0.00	10.00
GRASSES							
<i>Agropyron cristatum</i>	0.00	0.00	0.00	15.00	5.00	0.00	0.00
<i>Bromus inermis</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Bromus japonicus</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Bromus tectorum</i>	0.00	30.00	0.00	0.00	0.00	0.00	0.00
<i>Elymus cinereus</i>	0.00	0.00	0.00	0.00	0.00	0.00	10.00
<i>Elymus junceus</i>	0.00	0.00	0.00	30.00	10.00	0.00	10.00
<i>Elymus lanceolatus</i>	0.00	0.00	0.00	15.00	15.00	0.00	0.00
<i>Elymus salinus</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Elymus smithii</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Elymus spicatus</i>	0.00	0.00	0.00	0.00	0.00	35.00	0.00
<i>Hordeum jubatum</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Stipa hymenoides</i>	5.00	0.00	0.00	0.00	0.00	0.00	0.00
COVER							
Total Living Cover	50.00	40.00	65.00	60.00	35.00	80.00	60.00
Litter	15.00	10.00	25.00	15.00	25.00	10.00	10.00
Bareground	10.00	25.00	5.00	15.00	15.00	5.00	20.00
Rock	25.00	25.00	5.00	10.00	25.00	5.00	10.00
% COMPOSITION							
Shrubs	90.00	25.00	100.00	0.00	14.29	56.25	33.33
Forbs	0.00	0.00	0.00	0.00	0.00	0.00	33.33
Grasses	10.00	75.00	0.00	100.00	85.71	43.75	33.33

8.00	9.00	10.00	11.00	12.00	13.00	Mean	SDev	Freq
0.00	0.00	0.00	0.00	0.00	0.00	0.77	2.66	7.69
25.00	0.00	0.00	0.00	0.00	0.00	13.85	20.01	46.15
0.00	0.00	25.00	0.00	0.00	15.00	3.08	7.48	15.38
0.00	0.00	0.00	0.00	0.00	0.00	1.92	6.66	7.69
0.00	5.00	0.00	0.00	0.00	0.00	0.38	1.33	7.69
0.00	5.00	0.00	25.00	5.00	5.00	3.85	6.84	38.46
0.00	0.00	0.00	0.00	0.00	0.00	0.77	2.66	7.69
0.00	0.00	0.00	0.00	0.00	0.00	1.54	4.11	15.38
0.00	0.00	0.00	0.00	0.00	10.00	0.77	2.66	7.69
0.00	10.00	0.00	0.00	0.00	0.00	0.77	2.66	7.69
0.00	0.00	0.00	0.00	0.00	0.00	2.31	7.99	7.69
0.00	0.00	0.00	0.00	0.00	0.00	0.77	2.66	7.69
0.00	0.00	0.00	0.00	0.00	0.00	3.85	8.36	23.08
0.00	0.00	0.00	0.00	10.00	15.00	4.23	6.46	30.77
0.00	0.00	0.00	25.00	40.00	0.00	5.00	12.09	15.38
0.00	50.00	0.00	0.00	0.00	0.00	3.85	13.32	7.69
0.00	0.00	0.00	0.00	0.00	0.00	2.69	9.33	7.69
25.00	0.00	0.00	0.00	0.00	0.00	1.92	6.66	7.69
0.00	0.00	25.00	10.00	10.00	0.00	3.85	7.11	30.77
50.00	70.00	50.00	60.00	65.00	45.00	56.15	12.11	
25.00	10.00	20.00	10.00	10.00	10.00	15.00	6.20	
15.00	2.00	10.00	20.00	10.00	10.00	12.46	6.42	
10.00	18.00	20.00	10.00	15.00	35.00	16.38	8.81	
50.00	7.14	50.00	0.00	0.00	33.33	35.33	31.79	
0.00	7.14	0.00	41.67	7.69	11.11	7.77	13.29	
50.00	85.71	50.00	58.33	92.31	55.56	56.90	29.57	

ENERGY WEST-DEER CREEK

Pipeline

1986 Reveg Site

Acreage: 3.5 acres

Slope: 5-30 deg

Exposure: variable

Sample Date: 3-7 Aug 98

SHRUBS

Atriplex confertifolia

Chrysothamnus nauseosus

Eriogonum corymbosum

Gutierrezia sarothrae

Pseudotsuga menziesii

FORBS

Aster chilensis

Grindelia squarrosa

GRASSES

Agropyron cristatum

Bromus inermis

Bromus japonicus

Bromus tectorum

Elymus cinereus

Elymus junceus

Elymus lanceolatus

Elymus salinus

Elymus smithii

Elymus spicatus

Hordeum jubatum

Stipa hymenoides

COVER

Total Living Cover

Litter

Bareground

Rock

% COMPOSITION

Shrubs

Forbs

Grasses

PACIFICORP (ENERGY WEST)
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1998

SITE NAME: Deer Canyon
AREA: Deer Creek (1986 Reveg. Area)
DATE: August 3-7, 1998
WORKERS: P. Collins
SLOPE: 15-20 deg.
EXPOSURE: E
AREA: .1 acre
ANIMAL USE/DISTURBANCE: Negligible
EROSION: Negligible
COVER: (see quantitative data)

DOMINANT PLANT SPECIES OBSERVED:

Chrysothamnus nauseosus
Cercocarpus ledifolius

Aster chilensis
Machaeranthera canescens
Medicago sativa
Melilotus officinalis
Penstemon palmeri
Tragopogon dubius

Agropyron cristatum
Dactylis glomeratus
Elymus cinereus
Elymus spicatus
Elymus lanceolatus
Elymus cinereus
Elymus salinus
Elymus smithii
Poa pratensis
Stipa hymenoides

WOODY SPECIES DENSITY:	1997	(no./ac)	1998
<i>Chrysothamnus nauseosus</i>	2684.28		2199.59
<i>Rosa woodsii</i>			95.63
<i>Eriogonum corymbosum</i>	<u>116.71</u>		<u> </u>
Total	2800.99		2295.22

PRODUCTION:	1997	(lbs/ac)	1998
Herbaceous	520.82		535.83
Woody	<u>146.64</u>		<u>209.31</u>
Total	667.46		747.13

- NOTES: 1) We sampled randomly over entire area.
- 2) Sampled cover (n=6) and frequency (n=6) by ocular methods.
- 3) Sampled density (n=6) by pt. quarter methods.
- 4) Sampled productivity [n=6(30)] by clipping, weighing and double sampling.
- 5) Site looked excellent.

ENERGY WEST-DEER CREEK

Deer Canyon
 1986 Reveg Area
 Acreage: .1
 Slope: 15-20 deg
 Exposure: E

Sample Date: 3-7 Aug 98 1.00 2.00 3.00 4.00 5.00 6.00 Mean

 SHRUBS

Chrysothamnus nauseosus 5.00 15.00 0.00 5.00 10.00 20.00 9.17

FORBS

Aster chilensis 5.00 5.00 0.00 15.00 0.00 0.00 4.17

Machaeranthera canescens 5.00 5.00 10.00 0.00 0.00 0.00 3.33

Penstemon palmeri 5.00 0.00 0.00 0.00 0.00 0.00 0.83

Tragopogon dubius 0.00 5.00 0.00 0.00 0.00 0.00 0.83

GRASSES

Elymus cinereus 5.00 0.00 35.00 10.00 5.00 0.00 9.17

Elymus lanceolatus 15.00 0.00 15.00 40.00 20.00 30.00 20.00

Elymus smithii 0.00 10.00 0.00 0.00 20.00 0.00 5.00

Elymus salinus 0.00 0.00 0.00 0.00 10.00 15.00 4.17

Poa pratensis 5.00 0.00 0.00 0.00 0.00 0.00 0.83

 COVER

Total Living Cover 45.00 40.00 60.00 70.00 65.00 65.00 57.50

Litter 15.00 10.00 20.00 10.00 20.00 25.00 16.67

Bareground 15.00 25.00 5.00 5.00 5.00 5.00 10.00

Rock 25.00 25.00 15.00 15.00 10.00 5.00 15.83

 % COMPOSITION

Shrubs 11.11 37.50 0.00 7.14 15.38 30.77 16.98

Forbs 33.33 37.50 16.67 21.43 0.00 0.00 18.15

Grasses 55.56 25.00 83.33 71.43 84.62 69.23 64.86

ENERGY WEST-DEER CREEK

Deer Canyon
1986 Reveg Area

Acreage: .1
Slope: 15-20 deg

Exposure: E

Sample Date: 3-7 Aug 98

SDev	Freq	
6.72	83.33	SHRUBS <i>Chrysothamnus nauseosus</i>

SDev	Freq	
5.34	50.00	FORBS <i>Aster chilensis</i>
3.73	50.00	<i>Machaeranthera canescens</i>
1.86	16.67	<i>Penstemon palmeri</i>
1.86	16.67	<i>Tragopogon dubius</i>

SDev	Freq	
12.05	66.67	GRASSES <i>Elymus cinereus</i>
12.58	83.33	<i>Elymus lanceolatus</i>
7.64	33.33	<i>Elymus smithii</i>
6.07	33.33	<i>Elymus salinus</i>
1.86	16.67	<i>Poa pratensis</i>

SDev	Freq	
11.09		COVER Total Living Cover
5.53		Litter
7.64		Bareground
7.31		Rock

SDev	Freq	
13.12		% COMPOSITION Shrubs
14.59		Forbs
20.29		Grasses

PACIFICORP (ENERGY WEST)
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1998

SITE NAME: Access Road Slopes

AREA: Deer Creek Waste Rock Site (1989 Interim Reveg. Area)

DATE: August 3-7, 1998

WORKERS: P. Collins

SLOPE: 20 - 25 deg.

EXPOSURE: Variable

AREA: Part of 5 acres

ANIMAL USE/DISTURBANCE: Negligible

EROSION: Cut slopes has moderate erosion and sparse vegetation. There was much denser cover and woody species on the fill slopes with much less erosion.

COVER: (see quantitative data)

DOMINANT PLANT SPECIES OBSERVED:

Fill Slopes

Artemisia tridentata
Atriplex confertifolia
Atriplex canescens
Atriplex gardneri
Ceratoides lanata
Chrysothamnus nauseosus
Sarcobatus vermiculatus

Machaeranthera canescens
Medicago sativa
Penstemon palmeri

Elymus cinereus
Elymus lanceolatus
Elymus smithii
Poa secunda
Sporobolus airoides
Stipa hymenoides

Cut Slopes

Atriplex confertifolia
Atriplex gardneri
Chrysothamnus nauseosus

Halogeton glomeratus

Elymus lanceolatus
Sporobolus airoides

WOODY SPECIES DENSITY:	1998 (no./ac)
<i>Artemisia tridentata</i>	66.30
<i>Atriplex confertifolia</i>	397.79
<i>Atriplex gardneri</i>	530.38
<i>Ceratoides lanata</i>	331.49
<i>Chrysothamnus nauseosus</i>	1723.75
<i>Eriogonum corymbosum</i>	66.30
<u><i>Sarcobatus vermiculatus</i></u>	<u>66.30</u>
Total	3182.31

PRODUCTION:	1998 (lbs/ac)
Herbaceous	191.03
Woody	<u>517.05</u>
Total	708.08

- NOTES: 1) Method: We sampled regularly every 65' on cut-and-fill slopes. The even numbers on the cover sheet were "cut" slopes and the odd were "fill" slopes.
- 2) Sampled cover (n=12) and frequency (n=12) by ocular methods.
- 3) Sampled density (n=10) using the pt. quarter methods.
- 4) Sampled productivity [n=10(50)] by clipping, weighing and double sampling.
- 2) The cut slopes had about 50:50 weeds to desirable species.
- 3) The fill slope had >90% desirable species.
- 4) Therefore, the fill slopes looked much better than the cut slopes (from a vegetation stand point). Or, the fill slopes looked "good", whereas, the cut slope looked "poor".

DEER CREEK-WASTE ROCK SITE

Access Road Slope

1989 Interim Reveg Area

Acreage: part of 5 acres

Slope: 20-25 deg

Exposure: variable

Sample Date: 3-7 Aug 98

	1.00	2.00	3.00	4.00	5.00	6.00	7.00
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SHRUBS

<i>Artemisia tridentata</i>	0.00	0.00	0.00	0.00	25.00	0.00	0.00
<i>Atriplex confertifolia</i>	15.00	0.00	20.00	0.00	0.00	0.00	15.00
<i>Atriplex gardneri</i>	0.00	0.00	0.00	7.00	15.00	0.00	0.00
<i>Ceratoides lanata</i>	0.00	0.00	5.00	0.00	0.00	0.00	10.00
<i>Chrysothamnus nauseosus</i>	0.00	30.00	15.00	0.00	0.00	0.00	0.00

FORBS

<i>Penstemon palmeri</i>	0.00	0.00	0.00	0.00	0.00	0.00	5.00
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GRASSES

<i>Elymus cinereus</i>	0.00	0.00	0.00	0.00	5.00	0.00	0.00
<i>Elymus lanceolatus</i>	10.00	0.00	10.00	8.00	20.00	5.00	10.00
<i>Elymus spicatus</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Hordeum jubatum</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Poa secunda</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Sporobolus airoides</i>	10.00	0.00	10.00	0.00	0.00	0.00	0.00
<i>Stipa hymenoides</i>	10.00	10.00	0.00	0.00	0.00	0.00	10.00

COVER

Total Living Cover	45.00	40.00	60.00	15.00	65.00	5.00	50.00
Litter	10.00	5.00	15.00	5.00	10.00	5.00	10.00
Bareground	10.00	50.00	20.00	75.00	15.00	85.00	20.00
Rock	35.00	5.00	5.00	5.00	10.00	5.00	20.00

% COMPOSITION

Shrubs	33.33	75.00	66.67	46.67	61.54	0.00	50.00
Forbs	0.00	0.00	0.00	0.00	0.00	0.00	10.00
Grasses	66.67	25.00	33.33	53.33	38.46	100.00	40.00

8.00	9.00	10.00	11.00	12.00	Mean	SDev	Freq
0.00	0.00	0.00	0.00	0.00	2.08	6.91	8.33
0.00	0.00	0.00	0.00	5.00	4.58	7.20	33.33
0.00	0.00	0.00	0.00	0.00	1.83	4.41	16.67
0.00	5.00	0.00	0.00	0.00	1.67	3.12	25.00
15.00	25.00	0.00	10.00	0.00	7.92	10.50	41.67
0.00	0.00	0.00	0.00	0.00	0.42	1.38	8.33
0.00	0.00	0.00	0.00	0.00	0.42	1.38	8.33
0.00	0.00	7.00	10.00	0.00	6.67	5.81	66.67
0.00	10.00	0.00	0.00	0.00	0.83	2.76	8.33
5.00	0.00	0.00	0.00	0.00	0.42	1.38	8.33
0.00	0.00	0.00	30.00	0.00	2.50	8.29	8.33
0.00	15.00	0.00	0.00	0.00	2.92	5.19	25.00
0.00	0.00	0.00	0.00	0.00	2.50	4.33	25.00
20.00	55.00	7.00	50.00	5.00	34.75	21.81	
10.00	10.00	5.00	10.00	5.00	8.33	3.12	
50.00	15.00	85.00	15.00	70.00	42.50	28.69	
20.00	20.00	3.00	25.00	20.00	14.42	9.85	
75.00	54.55	0.00	20.00	100.00	48.56	29.36	
0.00	0.00	0.00	0.00	0.00	0.83	2.76	
25.00	45.45	100.00	80.00	0.00	50.60	29.53	

DEER CREEK-WASTE ROCK SITE

Access Road Slope

1989 Interim Reveg Area

Acreage: part of 5 acres

Slope: 20-25 deg

Exposure: variable

Sample Date: 3-7 Aug 98

SHRUBS

Artemisia tridentata

Atriplex confertifolia

Atriplex gardneri

Ceratoides lanata

Chrysothamnus nauseosus

FORBS

Penstemon palmeri

GRASSES

Elymus cinereus

Elymus lanceolatus

Elymus spicatus

Hordeum jubatum

Poa secunda

Sporobolus airoides

Stipa hymenoides

COVER

Total Living Cover

Litter

Bareground

Rock

% COMPOSITION

Shrubs

Forbs

Grasses

PACIFICORP (ENERGY WEST)
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1998

SITE NAME: Phase I Berm

AREA: Deer Creek Waste Rock Site (1989 Final Reveg. Area)

DATE: August 3-7, 1998

WORKERS: P. Collins

SLOPE: 0 - 20 deg.

EXPOSURE: Variable

AREA: 4 acres

ANIMAL USE/DISTURBANCE: Negligible

EROSION: Negligible

COVER: (qualitative data)

DOMINANT PLANT SPECIES OBSERVED:

Atriplex gardneri
Atriplex canescens
Atriplex gardneri
Chrysothamnus nauseosus
Sarcobatus vermiculatus

Halogeton glomeratus
Kochia scoparia
Malcomia africana
Salsola pestifer

Agropyron cristatum
Elymus lanceolatus
Hordeum jubatum
Stipa hymenoides

WOODY SPECIES DENSITY:	1998 (<u>no./ac</u>)
<i>Artemisia tridentata</i>	32.76
<i>Atriplex confertifolia</i>	65.52
<i>Atriplex gardneri</i>	392.15
<i>Atriplex corrugata</i>	98.29
<i>Atriplex canescens</i>	98.29
<i>Ceratoides lanata</i>	65.52
<i>Chrysothamnus nauseosus</i>	720.77
<u><i>Sarcobatus vermiculatus</i></u>	<u>98.29</u>
Total	1572.58

PRODUCTION:	1998 (<u>lbs/ac</u>)
Herbaceous	182.45
Woody	<u>185.52</u>
Total	367.96

- NOTES: 1) We sampled regularly on out-, top-, and in-slopes.
- 2) Sampled cover (n=12) and frequency (n=12) by ocular methods.
- 3) Sampled density (n=12) using the pt. quarter methods.
- 4) Sampled productivity [n=12(60)] by clipping, weighing and double sampling.
- 5) About 30% of the cover was "desirable" spp. and 70% of poor cover and weedy species.
- 6) This was a very dry and harsh site that seemed to be doing worse than previous years.

UP&L-DEER CREEK

Phase I Berm

Waste Rock Site

1989 Final Reveg

Acreage: 4 acres

Slope: 0-20 deg

Exposure: variable

Sample Date: 3-7 Aug 98

	1.00	2.00	3.00	4.00	5.00	6.00	7.00
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SHRUBS

<i>Atriplex gardneri</i>	0.00	0.00	0.00	0.00	0.00	0.00	3.00
<i>Ceratoides lanata</i>	0.00	0.00	0.00	8.00	0.00	0.00	0.00
<i>Chrysothamnus nauseosus</i>	0.00	0.00	0.00	2.00	10.00	10.00	0.00
<i>Sarcobatus vermiculatus</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00

FORBS

<i>Halogeton glomeratus</i>	0.00	5.00	0.00	0.00	0.00	0.00	25.00
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GRASSES

<i>Elymus lanceolatus</i>	10.00	0.00	5.00	0.00	0.00	0.00	2.00
<i>Hordeum jubatum</i>	0.00	0.00	5.00	0.00	0.00	0.00	0.00
<i>Stipa hymenoides</i>	0.00	5.00	0.00	15.00	10.00	20.00	0.00

COVER

Total Living Cover	10.00	10.00	10.00	25.00	20.00	30.00	30.00
Litter	5.00	5.00	10.00	5.00	10.00	10.00	5.00
Bareground	80.00	75.00	55.00	65.00	60.00	40.00	60.00
Rock	5.00	10.00	25.00	5.00	10.00	20.00	5.00

% COMPOSITION

Shrubs	0.00	0.00	0.00	40.00	50.00	33.33	10.00
Forbs	0.00	50.00	0.00	0.00	0.00	0.00	83.33
Grasses	100.00	50.00	100.00	60.00	50.00	66.67	6.67

8.00	9.00	10.00	11.00	12.00	Mean	SDev	Freq
0.00	0.00	0.00	0.00	0.00	0.25	0.83	8.33
0.00	0.00	0.00	0.00	0.00	0.67	2.21	8.33
2.00	10.00	0.00	5.00	5.00	3.67	4.05	58.33
0.00	0.00	0.00	10.00	0.00	0.83	2.76	8.33
0.00	0.00	10.00	0.00	0.00	3.33	7.17	25.00
0.00	0.00	25.00	0.00	5.00	3.92	7.04	41.67
0.00	0.00	0.00	0.00	0.00	0.42	1.38	8.33
5.00	0.00	0.00	10.00	5.00	5.83	6.40	58.33
7.00	10.00	35.00	25.00	15.00	18.92	9.38	
3.00	5.00	5.00	5.00	5.00	6.08	2.33	
85.00	55.00	50.00	60.00	75.00	63.33	12.64	
5.00	30.00	10.00	10.00	5.00	11.67	8.25	
28.57	100.00	0.00	60.00	33.33	29.60	29.33	
0.00	0.00	28.57	0.00	0.00	13.49	25.94	
71.43	0.00	71.43	40.00	66.67	56.90	29.55	

UP&L-DEER CREEK

Phase I Berm

Waste Rock Site

1989 Final Reveg

Acreage: 4 acres

Slope: 0-20 deg

Exposure: variable

Sample Date: 3-7 Aug 98

SHRUBS

Atriplex gardneri

Ceratoides lanata

Chrysothamnus nauseosus

Sarcobatus vermiculatus

FORBS

Halogeton glomeratus

GRASSES

Elymus lanceolatus

Hordeum jubatum

Stipa hymenoides

COVER

Total Living Cover

Litter

Bareground

Rock

% COMPOSITION

Shrubs

Forbs

Grasses

PACIFICORP (ENERGY WEST)
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1998

SITE NAME: Phase I Diversion

AREA: Deer Creek Waste Rock Site (1989 Final Reveg. Area)

DATE: August 3-7, 1998

WORKERS: P. Collins

SLOPE: 5 deg.

EXPOSURE: Variable

AREA: Part of 5 acres

ANIMAL USE/DISTURBANCE: Negligible

EROSION: (see notes below)

COVER: (see quantitative data)

DOMINANT PLANT SPECIES OBSERVED: (see quantitative data)

Atriplex gardneri
Atriplex confertifolia
Artemisia tridentata
Gutierrezia sarothrae
Sarcobatus vermiculatus

Penstemon palmeri

Agropyron cristatum
Sporobolus airoides
Elymus lanceolatus
Elymus cinereus
Stipa hymenoides

WOODY SPECIES DENSITY:	1998 (<u>no./ac</u>)
<i>Artemisia tridentata</i>	538.29
<i>Atriplex gardneri</i>	942.01
<i>Atriplex canescens</i>	201.86
<i>Chrysothamnus nauseosus</i>	1413.01
<i>Sarcobatus vermiculatus</i>	<u>134.57</u>
Total	3229.74

PRODUCTION:	1998 (<u>lbs/ac</u>)
Herbaceous	519.62
Woody	<u>278.14</u>
Total	797.76

- NOTES: 1) Methods: We sampled randomly on slopes.
- 2) Sampled cover (n=10) and frequency (n=10) by ocular methods.
- 3) Sampled density (n=12) using the pt. quarter methods.
- 4) Sampled productivity [n=12(60)] by clipping, weighing and double sampling.
- 5) Most of the samples were on the west side of the diversion.
- 6) Sample regularly every 30'.
- 7) Site looked excellent with good diversity, cover and woody species.

UP&L-DEER CREEK

Phase I Diversion

Waste Rock Site

1989 Final Reveg

Acreage: Part of 5 acres

Slope: 5 deg

Exposure: variable

Sample Date: 3-7 Aug 98

	1.00	2.00	3.00	4.00	5.00	6.00	7.00
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SHRUBS

<i>Atriplex confertifolia</i>	0.00	0.00	5.00	0.00	0.00	0.00	0.00
<i>Atriplex gardneri</i>	5.00	0.00	0.00	0.00	10.00	0.00	0.00
<i>Chrysothamnus nauseosus</i>	10.00	0.00	20.00	10.00	5.00	5.00	0.00

FORBS

<i>Penstemon palmeri</i>	5.00	5.00	5.00	0.00	5.00	0.00	0.00
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GRASSES

<i>Elymus lanceolatus</i>	0.00	10.00	5.00	0.00	0.00	0.00	0.00
<i>Elymus salinus</i>	0.00	20.00	0.00	0.00	0.00	20.00	0.00
<i>Elymus spicatus</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Poa fendleriana</i>	0.00	0.00	0.00	0.00	5.00	0.00	0.00
<i>Sporobolus airoides</i>	0.00	0.00	0.00	0.00	0.00	0.00	5.00
<i>Stipa hymenoides</i>	15.00	0.00	0.00	20.00	15.00	0.00	20.00

COVER

Total Living Cover	35.00	35.00	35.00	30.00	40.00	25.00	25.00
Litter	10.00	5.00	5.00	10.00	10.00	10.00	5.00
Bareground	50.00	55.00	55.00	50.00	40.00	60.00	65.00
Rock	5.00	5.00	5.00	10.00	10.00	5.00	5.00

% COMPOSITION

Shrubs	42.86	0.00	71.43	33.33	37.50	20.00	0.00
Forbs	14.29	14.29	14.29	0.00	12.50	0.00	0.00
Grasses	42.86	85.71	14.29	66.67	50.00	80.00	100.00

8.00	9.00	10.00	11.00	12.00	Mean	SDev	Freq
0.00	10.00	0.00	0.00	0.00	1.25	2.98	16.67
10.00	15.00	15.00	0.00	0.00	4.58	5.94	41.67
0.00	5.00	0.00	0.00	0.00	4.58	5.94	50.00
0.00	0.00	0.00	0.00	0.00	1.67	2.36	33.33
15.00	5.00	0.00	0.00	0.00	2.92	4.77	33.33
20.00	0.00	0.00	40.00	25.00	10.42	13.30	41.67
0.00	0.00	35.00	0.00	50.00	7.08	16.13	16.67
0.00	0.00	0.00	0.00	0.00	0.42	1.38	8.33
0.00	0.00	0.00	0.00	0.00	0.42	1.38	8.33
0.00	10.00	0.00	0.00	0.00	6.67	8.25	41.67
45.00	45.00	50.00	40.00	75.00	40.00	12.91	
15.00	10.00	10.00	10.00	10.00	9.17	2.76	
30.00	35.00	30.00	45.00	10.00	43.75	14.88	
10.00	10.00	10.00	5.00	5.00	7.08	2.47	
22.22	66.67	30.00	0.00	0.00	27.00	24.06	
0.00	0.00	0.00	0.00	0.00	4.61	6.54	
77.78	33.33	70.00	100.00	100.00	68.39	26.88	

UP&L-DEER CREEK

Phase I Diversion

Waste Rock Site

1989 Final Reveg

Acreage: Part of 5 acres

Slope: 5 deg

Exposure: variable

Sample Date: 3-7 Aug 98

SHRUBS

Atriplex confertifolia

Atriplex gardneri

Chrysothamnus nauseosus

FORBS

Penstemon palmeri

GRASSES

Elymus lanceolatus

Elymus salinus

Elymus spicatus

Poa fendleriana

Sporobolus airoides

Stipa hymenoides

COVER

Total Living Cover

Litter

Bareground

Rock

% COMPOSITION

Shrubs

Forbs

Grasses

COLOR
PHOTOGRAPHS



Deer Creek Mine - Riparian Areas (North)



Deer Creek Mine - Riparian Areas (South)



Deer Creek Mine - Sediment Pond Dam



Deer Creek Mine - Temp. Sediment Basin



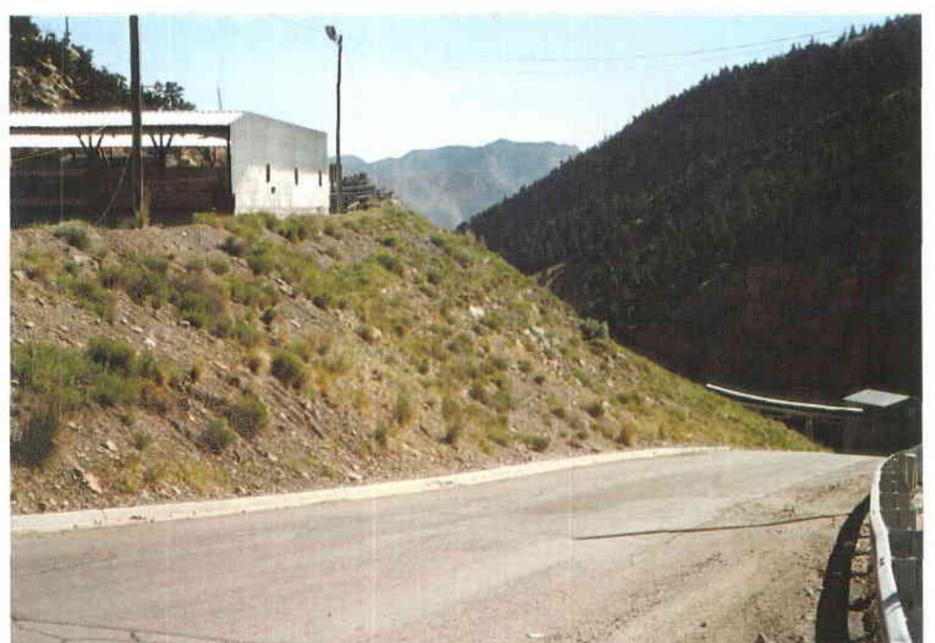
Deer Creek Mine - Roadside Areas (West Side)



Deer Creek Mine - Gate Areas Slope



Deer Creek Mine - Fan Road Slope



Deer Creek Mine - Refuse Pile and Berm



Deer Creek Mine - Rockslide and Berm



Deer Creek Mine - Water Plant Slope



Deer Creek Mine - Pipe Line



Deer Creek Mine - Deer Canyon



Deer Creek Mine - Access Road Slopes



Deer Creek Mine - Phase I Berm



Deer Creek Mine - Phase I Diversion '89

TRAIL MOUNTAIN MINE AREA

ENERGY WEST - TRAIL MOUNTAIN MINE

Trail Sediment Pond Outslope 1993

Exposure: E & S

Slope: 25 deg

Sample Date: 10-15 Aug 98

	1.00	2.00	3.00	4.00	5.00	6.00
--	------	------	------	------	------	------

SHRUBS

<i>Atriplex confertifolia</i>	0.00	0.00	0.00	0.00	0.00	0.00
<i>Artemisia tridentata</i>	0.00	0.00	0.00	25.00	0.00	0.00

FORBS

<i>Aster foliaceus</i>	30.00	40.00	40.00	10.00	5.00	35.00
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GRASSES

<i>Agropyron cristatum</i>	0.00	0.00	0.00	10.00	0.00	10.00
<i>Elymus cinereus</i>	0.00	0.00	0.00	0.00	0.00	0.00
<i>Elymus junceus</i>	0.00	0.00	0.00	0.00	15.00	0.00
<i>Elymus smithii</i>	15.00	0.00	0.00	0.00	0.00	0.00

COVER

Total Living Cover	45.00	40.00	40.00	45.00	20.00	45.00
Litter	20.00	10.00	25.00	10.00	5.00	10.00
Bareground	5.00	5.00	5.00	10.00	5.00	15.00
Rock	30.00	45.00	30.00	35.00	70.00	30.00

% COMPOSITION

Shrubs	0.00	0.00	0.00	55.56	0.00	0.00
Forbs	66.67	100.00	100.00	22.22	25.00	77.78
Grasses	33.33	0.00	0.00	22.22	75.00	22.22

7.00	8.00	9.00	10.00	Mean	SDev	Freq	ENERGY Trail Sedi Exposure: Slope: 25 Sample D
0.00	0.00	25.00	0.00	2.50	7.50	10.00	SHRUBS <i>Atriplex c</i>
0.00	0.00	0.00	0.00	2.50	7.50	10.00	<i>Artemisia</i>
0.00	35.00	0.00	35.00	23.00	16.16	80.00	FORBS <i>Aster folia</i>
0.00	0.00	10.00	10.00	4.00	4.90	40.00	GRASSE <i>Agropyro</i>
25.00	10.00	0.00	10.00	4.50	7.89	30.00	<i>Elymus ci</i>
0.00	0.00	0.00	0.00	1.50	4.50	10.00	<i>Elymus ju</i>
0.00	0.00	0.00	0.00	1.50	4.50	10.00	<i>Elymus s</i>
25.00	45.00	35.00	55.00	39.50	9.86		COVER Total Livi
10.00	10.00	15.00	25.00	14.00	6.63		Litter
5.00	5.00	10.00	10.00	7.50	3.35		Baregrou
60.00	40.00	40.00	10.00	39.00	15.94		Rock
0.00	0.00	71.43	0.00	12.70	25.64		% COMP Shrubs
0.00	77.78	0.00	63.64	53.31	36.46		Forbs
100.00	22.22	28.57	36.36	33.99	29.67		Grasses

PACIFICORP (ENERGY WEST)
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES

1998

SITE NAME: Parking Lot Extension ('96)

AREA: Trail Mountain Mine Area

DATE: August 10-15, 1998

WORKERS: P. Collins, D. Collins

SLOPE: 20 deg.

EXPOSURE: NW

ANIMAL USE/DISTURBANCE: Slight

EROSION: Slight

COVER: (see quantitative data)

DOMINANT PLANT SPECIES OBSERVED:

Aster foliaceus
Melilotus officinalis
Cirsium sp.

Elymus cinereus
Elymus smithii
Elymus lanceolatus

WOODY SPECIES DENSITY: 1998
(no./ac)

(No species in belts) 0.00

Total 0.00

- NOTES:
- 1) Methods: Meter square quadrats for cover.
 - 2) For density we used 5'X25' belt transect estimates.
 - 3) Maps shows that the entire area was seeded including the area with the large boulders. There was not much room for vegetation in the boulder area. We didn't sample it.
 - 4) The vegetation becoming established was on the west side of the boulder area. That is where we sampled (see photographs).

ENERGY WEST - TRAIL MOUNTAIN MINE

Trail Mountain Parking Ext. 1996

Exposure: N W

Slope: 20 deg

Sample Date: 10-15 Aug 98 1.00 2.00 3.00 4.00 5.00 Mean

SHRUBS

FORBS

<i>Cirsium</i>	0.00	0.00	5.00	0.00	0.00	1.00
<i>Aster foliaceus</i>	0.00	10.00	5.00	0.00	15.00	6.00
<i>Melilotus officinalis</i>	0.00	0.00	0.00	5.00	5.00	2.00

GRASSES

<i>Elymus cinereus</i>	35.00	5.00	15.00	10.00	10.00	15.00
<i>Elymus lanceolatus</i>	0.00	0.00	0.00	10.00	5.00	3.00
<i>Elymus smithii</i>	0.00	10.00	0.00	10.00	0.00	4.00

COVER

Total Living Cover	35.00	25.00	25.00	35.00	35.00	31.00
Litter	5.00	7.00	5.00	5.00	5.00	5.40
Bareground	5.00	3.00	15.00	15.00	40.00	15.60
Rock	55.00	65.00	55.00	45.00	20.00	48.00

% COMPOSITION

Shrubs	0.00	0.00	0.00	0.00	0.00	0.00
Forbs	0.00	40.00	40.00	14.29	57.14	30.29
Grasses	100.00	60.00	60.00	85.71	42.86	69.71

ENERGY WEST - TRAIL MOUNTAIN MINE

Trail Mountain Parking Ext. 1996

Exposure: N W

Slope: 20 deg

Sample Date: 10-15 Aug 98

SDev Freq

SHRUBS

FORBS

2.00	20.00	<i>Cirsium</i>
5.83	60.00	<i>Aster foliaceus</i>
2.45	40.00	<i>Mellilotus officinalis</i>

GRASSES

10.49	100.00	<i>Elymus cinereus</i>
4.00	40.00	<i>Elymus lanceolatus</i>
4.90	40.00	<i>Elymus smithii</i>

COVER

4.90	Total Living Cover
0.80	Litter
13.17	Bareground
15.36	Rock

% COMPOSITION

0.00	Shrubs
20.41	Forbs
20.41	Grasses

COLOR
PHOTOGRAPHS



Trail Mountain Mine - Trail Sed. Pond Outslope '93



Trail Mountain Mine - Trail Mtn. Parking Ext. '96

COTTONWOOD CANYON AREA

PACIFICORP (ENERGY WEST)
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1998

SITE NAME: Reclaimed Slope

AREA: Cottonwood Fan Portal Area

DATE: August 10-15, 1998

WORKERS: P. Collins, D. Collins

SLOPE: 35 deg.

EXPOSURE: W

ANIMAL USE/DISTURBANCE: Slight to moderate

EROSION: Slight, natural patterns.

COVER: (qualitative data only)

DOMINANT PLANT SPECIES OBSERVED: (see also quantitative data)

Artemisia nova
Artemisia tridentata
Atriplex canescens
Atriplex confertifolia
Chrysothamnus nauseosus

Aster foliaceus
Halogeton glomeratus

Agropyron cristatum
Elymus lanceolatus
Elymus salinus
Elymus junceus
Elymus cinereus
Stipa hymenoides

NOTES: 1) No quantitative data taken this year.

2) Area continues to look excellent.

PACIFICORP (ENERGY WEST)
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1998

SITE NAME: Soil Piles

AREA: Cottonwood Fan Portal Area

DATE: August 10-15, 1998

WORKERS: P. Collins, D. Collins

SLOPE: 35 deg.

EXPOSURE: Variable

ANIMAL USE/DISTURBANCE:

EROSION: Slight

COVER: approx. 35-40%

DOMINANT PLANT SPECIES OBSERVED:

Artemisia tridentata
Atriplex canescens
Atriplex confertifolia
Brickellia scabra
Chrysothamnus nauseosus
Eriogonum corymbosum
Rhus trilobata

Aster foliaceus
Astragalus chilensis

Agropyron cristatum
Elymus cinereus
Elymus lanceolatus
Elymus smithii
Elymus elymoides

- NOTES: 1) Qualitative sampling only.
2) Vegetation looked excellent this year.

PACIFICORP (ENERGY WEST)
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1998

SITE NAME: Reference Area

AREA: Cottonwood Fan Portal Area

DATE: August 10-15, 1998

WORKERS: P. Collins, D. Collins

SLOPE: 33 deg.

EXPOSURE: W

ANIMAL USE/DISTURBANCE: Slight to moderate

EROSION: Slight, natural patterns.

COVER: (qualitative data only)

DOMINANT PLANT SPECIES OBSERVED: (see also quantitative data)

Amalanchier utahensis
Atriplex confertifolia
Chrysothamnus nauseosus
Ephedra viridis
Juniperus osteosperma
Mahonia repens
Pinus edulis

Cryptantha sp.
Galium bifolium
Stanleya pinnata
Machaeranthera canescens

Elymus salinus
Stipa hymenoides

- NOTES: 1) No quantitative data taken this year.
2) Reference Area continues to look excellent.

PACIFICORP (ENERGY WEST)
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1998

SITE NAME: CFP Tube Conveyor Area (1996 Seeding)

AREA: Trail Mtn. Mine/Cottonwood Fan Portal Area

DATE: August 10-15, 1998

WORKERS: P. Collins, D. Collins

SLOPE: 28 deg.

EXPOSURE: W, N, S.

ANIMAL USE/DISTURBANCE: None

EROSION: Negligible. Rocks in area seem to be greatly enhancing erosion control.

COVER: (see quantitative data)

DOMINANT PLANT SPECIES OBSERVED:

Artemisia tridentata
Atriplex gardneri

Aster chilensis
Hedysarum boreale
Medicago sativa
Melilotus officinalis

Elymus junceum
Elymus lanceolatus
Elymus cinereus
Elymus smithii
Stipa hymenoides

WOODY SPECIES DENSITY:	1998 (<u>no./ac</u>)
<i>Atriplex gardneri</i>	217.80
<i>Artemisia tridentata</i>	<u>43.56</u>
Total	261.36

- NOTES:
- 1) Methods: Placed a 200 ft transect line on area. We sampled regularly every 20', then used random numbers.
 - 2) For density we used 5'X25' belt transects.
 - 3) This year the area was represented mostly by grasses with few shrubs and forbs.
 - 4) Last year (1997) the area was dominated by yellow sweetclover. This year we did not see much of it.

ENERGY WEST - COTTONWOOD FAN PORTAL
CFP Tube Conveyor (Reseed 1996)

Exposure: W,N,S

Slope: 28 deg.

Sample Date: 10-15 Aug 98

SHRUBS

	1.00	2.00	3.00	4.00	5.00	6.00
<i>Artemisia tridentata</i>	0.00	0.00	5.00	0.00	0.00	0.00
<i>Atriplex gardneri</i>	0.00	0.00	0.00	0.00	10.00	0.00

FORBS

<i>Aster foliaceus</i>	0.00	15.00	0.00	0.00	5.00	0.00
<i>Hedysarum boreale</i>	5.00	0.00	0.00	0.00	0.00	0.00
<i>Medicago sativa</i>	0.00	5.00	0.00	0.00	0.00	0.00
<i>Melilotus officinalis</i>	5.00	0.00	0.00	0.00	0.00	0.00

GRASSES

<i>Elymus cinereus</i>	0.00	0.00	0.00	15.00	0.00	5.00
<i>Elymus junceus</i>	0.00	0.00	0.00	0.00	0.00	0.00
<i>Elymus lanceolatus</i>	0.00	0.00	0.00	0.00	0.00	0.00
<i>Elymus smithii</i>	0.00	0.00	30.00	10.00	5.00	5.00
<i>Stipa hymenoides</i>	15.00	0.00	0.00	0.00	0.00	15.00

COVER

Total Living Cover	25.00	20.00	35.00	25.00	20.00	25.00
Erosion Mat	25.00	5.00	25.00	40.00	35.00	40.00
Bareground	35.00	50.00	25.00	25.00	30.00	20.00
Rock	15.00	25.00	15.00	10.00	15.00	15.00

% COMPOSITION

Shrubs	0.00	0.00	14.29	0.00	50.00	0.00
Forbs	40.00	100.00	0.00	0.00	25.00	0.00
Grasses	60.00	0.00	85.71	100.00	25.00	100.00

7.00	8.00	9.00	10.00	Mean	SDev	Freq	ENERGY CFP Tub Exposure: Slope: 28 Sample D
<hr/>							SHRUBS
0.00	0.00	0.00	0.00	0.50	1.50	10.00	<i>Artemisia</i>
0.00	0.00	0.00	0.00	1.00	3.00	10.00	<i>Atriplex g</i>
 							FORBS
0.00	25.00	25.00	0.00	7.00	10.05	40.00	<i>Aster folia</i>
0.00	0.00	0.00	0.00	0.50	1.50	10.00	<i>Hedysaru</i>
0.00	0.00	0.00	0.00	0.50	1.50	10.00	<i>Medicago</i>
0.00	0.00	5.00	5.00	1.50	2.29	30.00	<i>Melilotus</i>
 							GRASSE
0.00	0.00	0.00	0.00	2.00	4.58	20.00	<i>Elymus ci</i>
5.00	0.00	0.00	0.00	0.50	1.50	10.00	<i>Elymus ju</i>
10.00	0.00	0.00	0.00	1.00	3.00	10.00	<i>Elymus la</i>
25.00	15.00	10.00	5.00	10.50	9.60	80.00	<i>Elymus s</i>
0.00	5.00	0.00	0.00	3.50	5.94	30.00	<i>Stipa hym</i>
<hr/>							COVER
40.00	45.00	40.00	10.00	28.50	10.50		Total Livi
25.00	25.00	45.00	55.00	32.00	13.27		Erosion M
20.00	20.00	5.00	10.00	24.00	12.00		Baregrou
15.00	10.00	10.00	25.00	15.50	5.22		Rock
<hr/>							% COMP
0.00	0.00	0.00	0.00	6.43	15.14		Shrubs
0.00	55.56	75.00	50.00	34.56	33.91		Forbs
100.00	44.44	25.00	50.00	59.02	34.41		Grasses

PACIFICORP (ENERGY WEST)
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1998

SITE NAME: Belt Portal (~96)

AREA: Cottonwood Fan Portal Area

DATE: August 10-15, 1998

WORKERS: P. Collins, D. Collins

SLOPE: Variable deg.

EXPOSURE: SSW

ANIMAL USE/DISTURBANCE: Slight

EROSION: Slight

COVER: (see quantitative data)

DOMINANT PLANT SPECIES OBSERVED:

Artemisia tridentata
Chrysothamnus nauseosus
Rosa woodsii

Elymus cinereus
Elymus salinus

WOODY SPECIES DENSITY:	1998 (<u>no./ac</u>)
<i>Artemisia tridentata</i>	217.80
<i>Brickellia microphylla</i>	43.56
<i>Chrysothamnus nauseosus</i>	740.52
<i>Mahonia repens</i>	130.68
<i>Rosa woodsii</i>	<u>43.56</u>
Total	1172.12

NOTES: 1) Methods: Placed a 200 ft transect line on area. We sampled regularly every 20', then used random numbers.

2) For density we used 5'X25' belt transects.

ENERGY WEST - COTTONWOOD FAN PORTAL

Belt Portal 1996

Exposure: S,S,N

Slope:

Sample Date: 10-15 Aug 98 1.00 2.00 3.00 4.00 5.00 6.00

SHRUBS

<i>Artemisia tridentata</i>	0.00	0.00	0.00	0.00	0.00	0.00
<i>Chrysothamnus nauseosus</i>	20.00	0.00	0.00	0.00	0.00	25.00
<i>Rosa woodsii</i>	10.00	0.00	0.00	0.00	0.00	0.00

FORBS

GRASSES

<i>Elymus cinereus</i>	15.00	50.00	20.00	15.00	45.00	25.00
<i>Elymus salinus</i>	0.00	0.00	0.00	10.00	0.00	0.00

COVER

Total Living Cover	45.00	50.00	20.00	25.00	45.00	50.00
Erosion Mat	5.00	10.00	5.00	5.00	25.00	30.00
Bareground	5.00	10.00	5.00	10.00	25.00	5.00
Rock	45.00	30.00	70.00	60.00	5.00	15.00

% COMPOSITION

Shrubs	66.67	0.00	0.00	0.00	0.00	50.00
Forbs	0.00	0.00	0.00	0.00	0.00	0.00
Grasses	33.33	100.00	100.00	100.00	100.00	50.00

7.00	8.00	9.00	10.00	Mean	SDev	Freq	ENERGY Belt Porta Exposure: Slope: Sample D
0.00	0.00	5.00	0.00	0.50	1.50	10.00	SHRUBS
0.00	0.00	0.00	0.00	4.50	9.07	20.00	<i>Artemisia</i>
0.00	0.00	0.00	0.00	1.00	3.00	10.00	<i>Chrysotha</i> <i>Rosa woo</i>

FORBS

30.00	45.00	30.00	35.00	31.00	12.00	100.00	GRASSE
0.00	0.00	0.00	0.00	1.00	3.00	10.00	<i>Elymus ci</i> <i>Elymus s</i>

30.00	45.00	35.00	35.00	38.00	10.05		COVER
10.00	10.00	10.00	10.00	12.00	8.12		Total Livi
5.00	5.00	15.00	10.00	9.50	6.10		Erosion M
55.00	40.00	40.00	45.00	40.50	18.77		Baregrou
							Rock
0.00	0.00	14.29	0.00	13.10	23.31		% COMP
0.00	0.00	0.00	0.00	0.00	0.00		Shrubs
100.00	100.00	85.71	100.00	86.90	23.31		Forbs
							Grasses

ENERGY WEST - COTTONWOOD FAN PORTAL

Portal (Diesel) 1996

Exposure: S W

Slope: 34 deg

Sample Date: 10-15 Aug 98 1.00 2.00 3.00 4.00 5.00 6.00

SHRUBS

FORBS

Melilotus officinalis 5.00 5.00 0.00 0.00 0.00 0.00

GRASSES

Elymus cinereus 0.00 0.00 10.00 0.00 5.00 0.00
Elymus lanceolatus 5.00 5.00 5.00 0.00 0.00 10.00
Elymus smithii 20.00 30.00 20.00 15.00 15.00 0.00

COVER

Total Living Cover 30.00 40.00 35.00 15.00 20.00 10.00
Litter/Mat 55.00 45.00 50.00 75.00 55.00 80.00
Bareground 5.00 5.00 5.00 5.00 10.00 5.00
Rock 10.00 10.00 10.00 5.00 15.00 5.00

% COMPOSITION

Shrubs 0.00 0.00 0.00 0.00 0.00 0.00
Forbs 16.67 12.50 0.00 0.00 0.00 0.00
Grasses 83.33 87.50 100.00 100.00 100.00 100.00

ENERGY WEST - COTTONWOOD FAN PORTAL
 Portal (Diesel) 1996
 Exposure: S W
 Slope: 34 deg
 Sample Date: 10-15 Aug 98

Mean SDev Freq

 SHRUBS

1.67	2.36	33.33	FORBS <i>Melilotus officinalis</i>
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2.50	3.82	33.33	GRASSES <i>Elymus cinereus</i>
4.17	3.44	66.67	<i>Elymus lanceolatus</i>
16.67	8.98	83.33	<i>Elymus smithii</i>

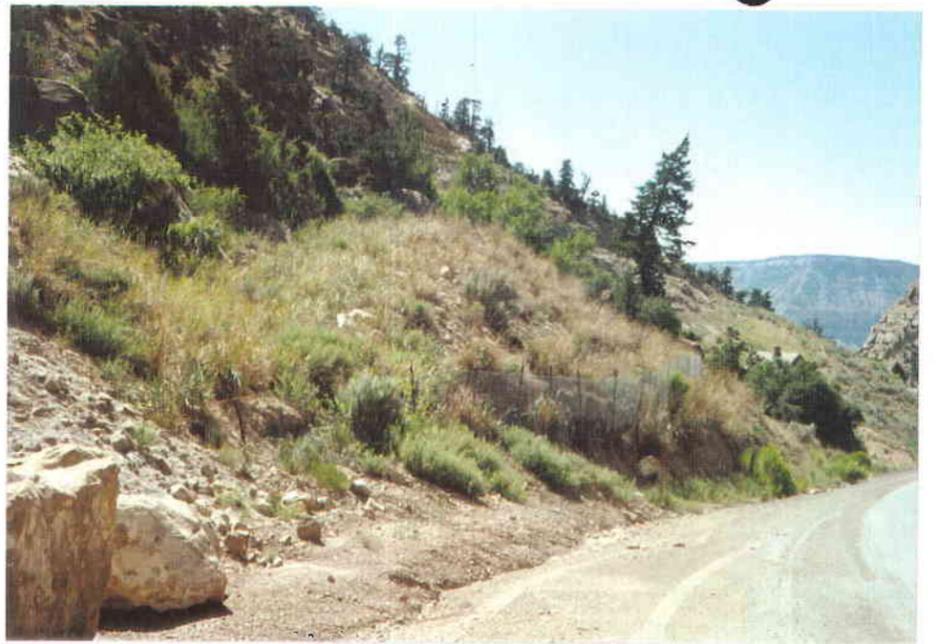
25.00	10.80		COVER
60.00	12.91		Total Living Cover
5.83	1.86		Litter/Mat
9.17	3.44		Bareground
			Rock

0.00	0.00		% COMPOSITION
4.86	6.98		Shrubs
95.14	6.98		Forbs
			Grasses

COLOR
PHOTOGRAPHS



Cottonwood Canyon - Reclaimed Slopes



Cottonwood Canyon - Soil Piles (Topsoil)



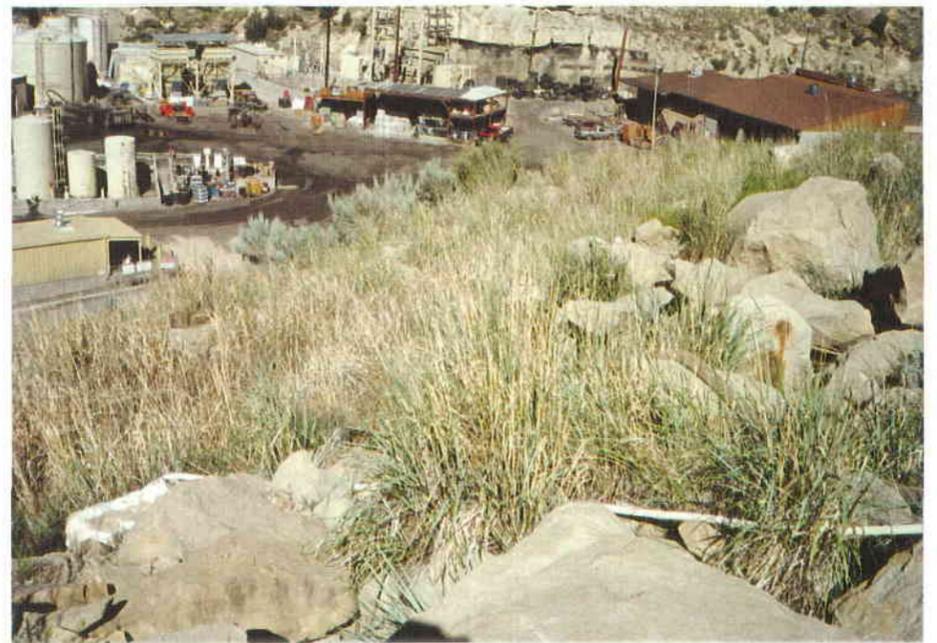
Cottonwood Canyon - Soil Piles (Subsoil)



Cottonwood Canyon - Reference Area



Cottonwood Canyon - Tube Conveyor Slope '96



Cottonwood Canyon - Belt Portal '96



Cottonwood Canyon - Portal (Diesel) '96

RILDA CANYON AREA

PACIFICORP (ENERGY WEST)
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1998

SITE NAME: Pad Area Slopes (96)
AREA: Rilda Canyon
DATE: August 3-7, 1998
WORKERS: P. Collins, D. Collins
SLOPE: 20-30 deg.
EXPOSURE: variable

ANIMAL USE/DISTURBANCE: Slight

EROSION: None observed

COVER: See quantitative data.

DOMINANT PLANT SPECIES OBSERVED:

Populus tremuloides

Hedysarum boreale

Melilotus officinalis

Cynoglossum officinale

Penstemon palmeri

Poa pratensis

Elymus smithii

Elymus elymoides

Elymus lanceolatus

WOODY SPECIES DENSITY:	1997 (no./ac)
<i>Rosa woodsii</i>	130.68
<i>Populus tremuloides</i>	130.68
<i>Populus angustifolia</i>	<u>43.56</u>
Total	304.92

- NOTES: 1) We sampled regularly around entire pad.
- 2) There was quite a lot of cover variability, ranging from 0-65%. The sparse cover was where there was no erosion control matting. The

greatest cover was found behind the fan.

- 3) Sampled cover (n=10) and frequency (n=10) by ocular methods.
- 4) Sampled density (n=8) with belt transects (5'X25').
- 5) Was seeded in the Fall of 1995.

ENERGY WEST-RILDA CANYON

Pad Area Slope 1996

Slope: 20-30 deg

Exposure: Variable

Sample Date: 3-7 Aug 98

	1.00	2.00	3.00	4.00	5.00	6.00	7.00
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TREES & SHRUBS

<i>Populus tremuloides</i>	0.00	0.00	0.00	0.00	0.00	5.00	0.00
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FORBS

<i>Hedysarum boreale</i>	0.00	2.00	2.00	0.00	0.00	0.00	0.00
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<i>Melilotus officinalis</i>	5.00	3.00	3.00	30.00	8.00	20.00	0.00
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<i>Penstemon palmeri</i>	0.00	2.00	0.00	0.00	0.00	0.00	0.00
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GRASSES

<i>Elymus lanceolatus</i>	20.00	3.00	5.00	5.00	7.00	10.00	25.00
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<i>Elymus smithii</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00
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<i>Elymus elymoides</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00
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COVER

Total Living Cover	25.00	10.00	10.00	35.00	15.00	35.00	25.00
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Litter/Mat	10.00	5.00	5.00	55.00	70.00	45.00	10.00
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Bareground	35.00	30.00	30.00	5.00	5.00	10.00	40.00
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Rock	30.00	55.00	55.00	5.00	10.00	10.00	25.00
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% COMPOSITION

Shrubs	0.00	0.00	0.00	0.00	0.00	14.29	0.00
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Forbs	20.00	70.00	50.00	85.71	53.33	57.14	0.00
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Grasses	80.00	30.00	50.00	14.29	46.67	28.57	100.00
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ENERGY WEST-RI
 Pad Area Slope 199
 Slope: 20-30 deg
 Exposure: Variable
 Sample Date: 3-7 Au

8.00	9.00	10.00	Mean	SDev	Freq	
0.00	0.00	0.00	0.50	1.50	10.00	TREES & SHRUBS <i>Populus tremuloides</i>
0.00	0.00	0.00	0.40	0.80	10.00	FORBS <i>Hedysarum boreale</i>
30.00	25.00	0.00	12.40	11.81	80.00	<i>Melilotus officinalis</i>
0.00	0.00	0.00	0.20	0.60	10.00	<i>Penstemon palmeri</i>
10.00	25.00	30.00	14.00	9.48	100.00	GRASSES <i>Elymus lanceolatus</i>
0.00	0.00	10.00	1.00	3.00	10.00	<i>Elymus smithii</i>
10.00	0.00	10.00	2.00	4.00	20.00	<i>Elymus elymoides</i>
50.00	50.00	50.00	30.50	15.24		COVER Total Living Cover
5.00	40.00	15.00	26.00	23.00		Litter/Mat
5.00	5.00	25.00	19.00	13.56		Bareground
40.00	5.00	10.00	24.50	18.77		Rock
0.00	0.00	0.00	1.43	4.29		% COMPOSITION Shrubs
60.00	50.00	0.00	44.62	27.29		Forbs
40.00	50.00	100.00	53.95	28.27		Grasses

PACIFICORP (ENERGY WEST)
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1998

SITE NAME: Roadway Slopes

AREA: Rilda Canyon

DATE: August 3-7, 1998

WORKERS: P. Collins, D. Collins

SLOPE: 10-20 deg.

EXPOSURE: E

ANIMAL USE/DISTURBANCE:

EROSION: Negligible

COVER: (see report included)

DOMINANT PLANT SPECIES OBSERVED:

Chrysothamnus nauseosus
Artemisia tridentata
Ribes aureum
Rosa woodsii
Mahonia repens

Aster foliaceus
Medicago sativa
Penstemon palmeri
Hedysarum boreale
Melilotus officinalis
Sanquisorba minor

Bromus inermis
Elymus lanceolatus
Elymus smithii
Elymus elymoides
Elymus cinereus
Elymus junceus

WOODY SPECIES DENSITY:	1998 (<u>no./ac</u>)
<i>Rosa woodsii</i>	<u>435.60</u>
Total	435.60

- NOTES:
- 1) We sampled the area, then learned that Energy West wanted to compare the cover data with the reference area to explore the possibility of removing the silt fence.
 - 2) We then took additional samples and later wrote a report (included with this document).
 - 3) The density was not shown in the above report. It is included above. We used 5'X25' belts for the density measurements.

ENERGY WEST

Rilda Canyon

Roadway Slopes

Sample Date: Aug. 3-7 1998

Exposure: East

Slope: 10-20 deg.

	1.00	2.00	3.00	4.00	5.00	6.00	7.00
TREES & SHRUBS							
<i>Abies concolor</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Mahonia repens</i>	0.00	0.00	0.00	0.00	0.00	0.00	10.00
<i>Populus tremuloides</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Ribes aureum</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Rosa woodsii</i>	0.00	0.00	0.00	0.00	0.00	0.00	5.00
FORBS							
<i>Cynoglossum officinale</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Geranium richardsonii</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Hedysarum boreale</i>	0.00	0.00	0.00	0.00	0.00	5.00	0.00
<i>Medicago sativa</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Melilotus officinalis</i>	10.00	10.00	25.00	25.00	15.00	5.00	0.00
<i>Penstemon eatonii</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Penstemon palmeri</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Sanquisorba minor</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GRASSES							
<i>Bromus inermis</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Elymus cinereus</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Elymus elymoides</i>	5.00	0.00	5.00	5.00	0.00	0.00	0.00
<i>Elymus lanceolatus</i>	0.00	0.00	0.00	0.00	0.00	35.00	10.00
<i>Elymus smithii</i>	10.00	20.00	5.00	15.00	25.00	0.00	0.00
<i>Elymus spicatus</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COVER							
Total Living Cover	25.00	30.00	35.00	45.00	40.00	45.00	25.00
Erosion Control Mat	65.00	45.00	35.00	25.00	30.00	45.00	65.00
Bareground	5.00	10.00	15.00	15.00	15.00	5.00	5.00
Rock	5.00	15.00	15.00	15.00	15.00	5.00	5.00
% COMPOSITION							
Shrubs	0.00	0.00	0.00	0.00	0.00	0.00	60.00
Forbs	40.00	33.33	71.43	55.56	37.50	22.22	0.00
Grasses	60.00	66.67	28.57	44.44	62.50	77.78	40.00

8.00	9.00	10.00	11.00	12.00	13.00	14.00	15.00	16.00
0.00	0.00	0.00	0.00	0.00	10.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	20.00	10.00
5.00	0.00	0.00	10.00	0.00	0.00	10.00	15.00	15.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	5.00	5.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00	0.00
0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00	5.00
0.00	10.00	0.00	0.00	0.00	0.00	5.00	0.00	0.00
20.00	15.00	15.00	30.00	35.00	0.00	15.00	10.00	10.00
0.00	0.00	0.00	5.00	0.00	33.00	0.00	0.00	10.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25.00	30.00	20.00	50.00	45.00	45.00	35.00	45.00	50.00
65.00	50.00	70.00	35.00	40.00	45.00	50.00	35.00	30.00
5.00	10.00	5.00	10.00	10.00	5.00	10.00	10.00	10.00
5.00	10.00	5.00	5.00	5.00	5.00	5.00	10.00	10.00
0.00	16.67	0.00	0.00	0.00	22.22	0.00	0.00	0.00
20.00	0.00	25.00	30.00	11.11	4.44	28.57	77.78	50.00
80.00	83.33	75.00	70.00	88.89	73.33	71.43	22.22	50.00

17.00	18.00	19.00	20.00	21.00	22.00	23.00	24.00	25.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	15.00	0.00	5.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	3.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	15.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.00	0.00
5.00	5.00	0.00	0.00	0.00	10.00	5.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15.00	10.00	0.00	3.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00
0.00	0.00	0.00	0.00	2.00	0.00	5.00	0.00	0.00
0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
35.00	10.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	10.00	0.00	0.00	0.00	0.00
0.00	15.00	15.00	0.00	0.00	25.00	15.00	15.00	65.00
10.00	5.00	0.00	20.00	15.00	0.00	15.00	15.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
65.00	45.00	45.00	25.00	50.00	35.00	40.00	45.00	70.00
25.00	40.00	45.00	65.00	50.00	55.00	50.00	5.00	20.00
5.00	5.00	5.00	5.00	5.00	5.00	5.00	20.00	5.00
5.00	10.00	5.00	5.00	-5.00	5.00	5.00	30.00	5.00
0.00	0.00	66.67	8.00	16.00	0.00	0.00	0.00	0.00
30.77	33.33	0.00	12.00	14.00	28.57	25.00	33.33	7.14
69.23	66.67	33.33	80.00	50.00	71.43	75.00	66.67	92.86

26.00	27.00	28.00	29.00	30.00	Mean	SDev	Freq
0.00	0.00	0.00	0.00	0.00	0.33	1.80	3.33
0.00	0.00	0.00	0.00	0.00	1.00	3.27	10
0.00	0.00	0.00	0.00	0.00	0.10	0.54	3.33
0.00	0.00	0.00	0.00	0.00	0.07	0.36	3.33
0.00	0.00	0.00	5.00	0.00	1.00	3.00	13.33
10.00	0.00	0.00	0.00	0.00	0.33	1.80	3.33
0.00	0.00	0.00	0.00	0.00	0.50	2.69	3.33
0.00	0.00	0.00	10.00	0.00	1.50	2.93	23.33
0.00	0.00	0.00	0.00	20.00	1.67	5.22	10
0.00	0.00	5.00	10.00	15.00	6.77	7.50	56.67
0.00	0.00	0.00	0.00	0.00	0.17	0.90	3.33
0.00	0.00	0.00	0.00	0.00	0.57	1.52	13.33
0.00	0.00	0.00	0.00	0.00	0.23	0.96	6.67
0.00	0.00	0.00	0.00	0.00	0.17	0.90	3.33
10.00	0.00	0.00	0.00	5.00	2.33	6.67	20
0.00	0.00	0.00	0.00	0.00	1.33	2.87	20
45.00	70.00	0.00	25.00	0.00	16.17	18.42	63.33
0.00	0.00	0.00	0.00	10.00	7.10	8.90	50
0.00	0.00	30.00	0.00	0.00	1.00	5.39	3.33
65.00	70.00	35.00	50.00	50.00	42.67	13.09	
25.00	10.00	55.00	40.00	20.00	41.17	16.52	
5.00	10.00	5.00	5.00	15.00	8.17	4.18	
5.00	10.00	5.00	5.00	15.00	8.00	6.00	
0.00	0.00	0.00	10.00	0.00	6.65	16.24	
15.38	0.00	14.29	40.00	70.00	27.69	20.95	
84.62	100.00	85.71	50.00	30.00	64.99	19.90	

ENERGY WEST

Rilda Canyon

Roadway Slopes

Sample Date: Aug. 3-7 1998

Exposure: East

Slope: 10-20 deg.

TREES & SHRUBS

Abies concolor

Mahonia repens

Populus tremuloides

Ribes aureum

Rosa woodsii

FORBS

Cynoglossum officinale

Geranium richardsonii

Hedysarum boreale

Medicago sativa

Melilotus officinalis

Penstemon eatonii

Penstemon palmeri

Sanquisorba minor

GRASSES

Bromus inermis

Elymus cinereus

Elymus elymoides

Elymus lanceolatus

Elymus smithii

Elymus spicatus

COVER

Total Living Cover

Erosion Control Mat

Bareground

Rock

% COMPOSITION

Shrubs

Forbs

Grasses

PACIFICORP (ENERGY WEST)
 QUALITATIVE SAMPLING DATA SHEET AND
 QUANTITATIVE/QUALITATIVE NOTES
 1998

SITE NAME: Topsoil Pile

AREA: Rilda Canyon

DATE: August 3-7, 1998

WORKERS: P. Collins, D. Collins

SLOPE: 30 deg.

EXPOSURE: E

ANIMAL USE/DISTURBANCE: Slight, including elk.

EROSION: None observed

COVER: Approx. 15%-20%

DOMINANT PLANT SPECIES OBSERVED:

Rosa woodsii

Cirsium sp.

Hedysarum boreale

Medicago sativa

Melilotus officinalis

Cynoglossum officinale

Penstemon palmeri

Elymus lanceolatus

Elymus elymoides

Elymus smithii

Elymus spicatus

WOODY SPECIES DENSITY:	1997	1998
		(no./ac)
<i>Rosa woodsii</i>	0	<u>304.92</u>
Total	0	304.92

- NOTES: 1) We sampled using a 100' tape up the side slope the to the top of the pile only (not roadway).
- 2) Sampled cover (n=10) and frequency (n=10) by ocular methods.

- 3) Sampled density (n=8) with belt transects (5'X25').
- 4) Was seeded in the Fall of 1995.
- 5) In 1997 it was reported that "from a distance it appeared the entire pile was growing nothing but yellow sweetclover, but on further examination there were lots of grasses under it."

In 1998, the grasses dominated the site.

- 7) Did not observe any woody species on the pile.

ENERGY WEST-RILDA CANYON

Topsoil Pile 1995

Slope: 30 deg

Exposure: East

Sample Date: 3-7 Aug 98 1.00 2.00 3.00 4.00 5.00 6.00 7.00

TREES & SHRUBS

Rosa woodsii 0.00 5.00 0.00 0.00 0.00 0.00 0.00

FORBS

Cirsium sp. 0.00 0.00 0.00 5.00 0.00 10.00 0.00

Cynoglossum officinale 0.00 0.00 0.00 10.00 0.00 5.00 0.00

Hedysarum boreale 5.00 5.00 0.00 0.00 0.00 0.00 0.00

Medicago sativa 5.00 0.00 0.00 0.00 0.00 0.00 0.00

Melilotus officinalis 0.00 0.00 25.00 15.00 25.00 5.00 0.00

GRASSES

Elymus cinereus 5.00 0.00 0.00 0.00 0.00 0.00 0.00

Elymus elymoides 0.00 0.00 0.00 0.00 0.00 0.00 10.00

Elymus lanceolatus 0.00 0.00 0.00 0.00 0.00 0.00 10.00

Elymus smithii 15.00 35.00 20.00 10.00 15.00 20.00 30.00

COVER

Total Living Cover 30.00 45.00 45.00 40.00 40.00 40.00 50.00

Litter 5.00 10.00 10.00 10.00 40.00 10.00 15.00

Bareground 40.00 30.00 30.00 35.00 10.00 40.00 10.00

Rock 25.00 15.00 15.00 15.00 10.00 10.00 25.00

% COMPOSITION

Shrubs 0.00 11.11 0.00 0.00 0.00 0.00 0.00

Forbs 33.33 11.11 55.56 75.00 62.50 50.00 0.00

Grasses 66.67 77.78 44.44 25.00 37.50 50.00 100.00

ENERGY WEST-RI
 Topsoil Pile 1995
 Slope: 30 deg
 Exposure: East
 Sample Date: 3-7 Au

8.00	9.00	10.00	Mean	SDev	Freq	
0.00	0.00	0.00	0.50	1.50	10.00	TREES & SHRUBS <i>Rosa woodsii</i>
5.00	0.00	0.00	2.00	3.32	30.00	FORBS <i>Cirsium sp.</i>
0.00	0.00	0.00	1.50	3.20	20.00	<i>Cynoglossum officin</i>
5.00	5.00	20.00	4.00	5.83	50.00	<i>Hedysarum boreale</i>
0.00	0.00	0.00	0.50	1.50	10.00	<i>Medicago sativa</i>
0.00	0.00	0.00	7.00	10.05	40.00	<i>Melilotus officinalis</i>
5.00	15.00	0.00	2.50	4.61	30.00	GRASSES <i>Elymus cinereus</i>
0.00	0.00	0.00	1.00	3.00	10.00	<i>Elymus elymoides</i>
25.00	25.00	0.00	6.00	9.95	30.00	<i>Elymus lanceolatus</i>
0.00	10.00	25.00	18.00	9.80	90.00	<i>Elymus smithii</i>
40.00	55.00	45.00	43.00	6.40		COVER Total Living Cover
10.00	10.00	30.00	15.00	10.49		Litter
35.00	25.00	10.00	26.50	11.63		Bareground
15.00	10.00	15.00	15.50	5.22		Rock
0.00	0.00	0.00	1.11	3.33		% COMPOSITION Shrubs
25.00	9.09	44.44	36.60	23.74		Forbs
75.00	90.91	55.56	62.29	22.76		Grasses

*PLANT COVER COMPARISONS:
ROADWAY SLOPES VS. REFERENCE AREA
IN RILDA CANYON
1998*



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September 24, 1998

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*PLANT COVER COMPARISONS:
ROADWAY SLOPES VS. REFERENCE AREA
IN RILDA CANYON*

INTRODUCTION

Energy West Mining Company has constructed a fan portal and facilities in Rilda Canyon, a tributary of Huntington Canyon. The outslopes of the access road to the fan portal has been reseeded to provide plant cover for aesthetics, wildlife forage and erosion control. Silt fencing was placed at the toe of the outslopes at the time of seeding to provide erosion control until the vegetative cover becomes established enough to maintain this function.

When a qualitative assessment was made of the area in the Spring 1998, it appeared that there may be enough cover to provide adequate erosion control without the silt fencing. To determine whether or not this may be true, a quantitative study was done in the Summer 1998. As a measure of comparison, a reference area that was chosen previously as a standard for final revegetation success was used in this study to compare its cover with the cover of the seeded outslopes or "Roadway Slopes".

METHODS

A transect line was placed nearly the entire length of the Roadway Slopes above the silt fencing

which was placed at the toe to control erosion. Square meter quadrats were placed at random numbers along the transect line. Ocular methods were used to estimate total cover and cover by species at each sample location. Species composition and relative frequencies were also assessed from the quadrats. Additional information recorded on the raw data sheets were: estimated precipitation, slope, exposure, grazing use, animal disturbance and other appropriate notes. Plant nomenclature follows Welsh et al. (1993). Field data for the Roadside Areas were recorded between August 3-7, 1998.

Data from sampling an Aspen/Fir/Dogwood Reference Area in 1990 were used as a comparison to the 1998 Roadside Slopes data. Although the sample years were different, sample methodologies were consistent. With seasonal and climatic variations, minor changes may occur between years in the reference area, but because it is considered to be a climax community, these changes should be negligible – at least for the scope of this study.

Student's t-tests were employed to compare the reseeded area with the reference area for cover. All sample means, standard deviations, and sample sizes were included in the tables of this report to enable the reviewers to apply further statistical tests if desired.

RESULTS

Total living cover of the reseeded Roadway Slopes was estimated to be 42.67%, whereas the total living understory cover for the Aspen/Fir/Dogwood Reference area was 40.73% (Table 1). This

difference was statistically insignificant when the Student's t-test was employed. ($t=0.547$, $p<.001$).

Composition of the Roadway Slopes was dominated by grasses. The composition of the reference area was dominated by trees and shrubs. Nearly all the species present in the quadrats were desirable species. For cover by species are reported in the raw data spreadsheets.

DISCUSSION

The present plant cover of the reseeded Roadway Slopes should be enough to control erosion so that the silt fencing could be removed. This statement is based on the fact that there is about the same amount of cover in the reseeded area when compared to the undisturbed community chosen to be a standard for final revegetation success (Aspen/Fir/Dogwood Reference Area). It is true, however, that this Reference Area would also have overstory cover (overstory was not estimated in the 1990) that could also enhance erosion control in this community. It is still the author's opinion that erosion will be controlled at least as much as adjacent undisturbed communities for more reasons than merely comparability of the two understory covers. Specifically, if the understory cover compositions are also compared, one notices that the reseeded area composition is dominated by grasses and forbs (combined they were 92.68% of the total living cover). The reference area composition was dominated by trees and shrubs. Generally, grasses and forbs control surface erosion better than trees and shrubs, especially if the grasses are rhizomatous or

sod-forming. Additionally, two other reference areas were compared in Rilda Canyon that were chosen previously for revegetation success standards and did not have a significant overstory cover. When the total living cover of these two communities were compared, their values were also similar to that of the reseeded Roadside Area (The Mtn. Mahogany/Salina Wildrye Reference Area total living cover was 32.15%; the cover of the Sagebrush/Grass Reference Area was 45.00%). This further suggests that erosion should not be a significant problem in the reseeded areas.

TABLE 1: Summary of total cover and composition for the (A) Roadway Slopes and (B) Aspen/Fir/Dogwood Reference Area in Rilda Canyon.

A. Roadside Areas (1998)

TOTAL COVER	% MEAN COVER	STANDARD DEVIATION	SAMPLE SIZE
Understory	42.67	13.09	30
Litter	41.17	16.52	30
Bareground	8.17	4.18	30
Rock	8.00	6.00	30

UNDERSTORY COMPOSITION	PERCENT	STANDARD DEVIATION	SAMPLE SIZE
Trees & Shrubs	6.65	16.24	30
Forbs	27.69	20.95	30
Grasses	64.99	19.90	30

B. Aspen/Fir/Dogwood Reference Area (1990)

TOTAL COVER	% MEAN COVER	STANDARD DEVIATION	SAMPLE SIZE
Understory	40.73	14.36	30
Litter	50.47	18.02	30
Bareground	4.77	11.85	30
Rock	4.03	5.88	30

UNDERSTORY COMPOSITION	PERCENT	STANDARD DEVIATION	SAMPLE SIZE
Trees & Shrubs	90.78	9.58	30
Forbs	5.83	7.30	30
Grasses	3.38	6.37	30

RAW DATA

ENERGY WEST

Rilda Canyon

Roadway Slopes

Sample Date: Aug. 3-7 1998

Exposure: East

Slope: 10-20 deg.

	1	2	3	4	5	6	7	8	9	10	11	12	13
TREES & SHRUBS													
<i>Abies concolor</i>	0	0	0	0	0	0	0	0	0	0	0	0	10
<i>Mahonia repens</i>	0	0	0	0	0	0	10	0	0	0	0	0	0
<i>Populus tremuloides</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Ribes aureum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Rosa woodsii</i>	0	0	0	0	0	0	5	0	5	0	0	0	0
FORBS													
<i>Cynoglossum officinale</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Geranium richardsonii</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Hedysarum boreale</i>	0	0	0	0	0	5	0	0	0	5	0	0	0
<i>Medicago sativa</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Melilotus officinalis</i>	10	10	25	25	15	5	0	5	0	0	10	0	0
<i>Penstemon eatonii</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Penstemon palmeri</i>	0	0	0	0	0	0	0	0	0	0	5	5	0
<i>Sanquisorba minor</i>	0	0	0	0	0	0	0	0	0	0	0	0	2
GRASSES													
<i>Bromus inermis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Elymus cinereus</i>	0	0	0	0	0	0	0	0	0	0	0	5	0
<i>Elymus elymoides</i>	5	0	5	5	0	0	0	0	10	0	0	0	0
<i>Elymus lanceolatus</i>	0	0	0	0	0	35	10	20	15	15	30	35	0
<i>Elymus smithii</i>	10	20	5	15	25	0	0	0	0	0	5	0	33
<i>Elymus spicatus</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
COVER													
Total Living Cover	25	30	35	45	40	45	25	25	30	20	50	45	45
Erosion Control Mat	65	45	35	25	30	45	65	65	50	70	35	40	45
Bareground	5	10	15	15	15	5	5	5	10	5	10	10	5
Rock	5	15	15	15	15	5	5	5	10	5	5	5	5
% COMPOSITION													
Shrubs	0.00	0.00	0.00	0.00	0.00	0.00	60.00	0.00	16.67	0.00	0.00	0.00	22.22
Forbs	40.00	33.33	71.43	55.56	37.50	22.22	0.00	20.00	0.00	25.00	30.00	11.11	4.44
Grasses	60.00	66.67	28.57	44.44	62.50	77.78	40.00	80.00	83.33	75.00	70.00	88.89	73.33

14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	15	0	5	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	15	0	0	0	0	0	0	0	0	0	5	0
0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0
0	0	0	0	0	0	0	0	0	0	15	0	0	0	0	0	0
0	0	0	5	5	0	0	0	10	5	0	0	0	0	0	10	0
0	20	10	0	0	0	0	0	0	0	0	0	0	0	0	0	20
10	15	15	15	10	0	3	0	0	0	0	0	0	0	5	10	15
0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0
0	0	0	0	0	0	0	2	0	5	0	0	0	0	0	0	0
0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	5	35	10	0	0	0	0	0	0	0	10	0	0	0	5
5	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0
15	10	10	0	15	15	0	0	25	15	15	65	45	70	0	25	0
0	0	10	10	5	0	20	15	0	15	15	0	0	0	0	0	10
0	0	0	0	0	0	0	0	0	0	0	0	0	0	30	0	0
35	45	50	65	45	45	25	50	35	40	45	70	65	70	35	50	50
50	35	30	25	40	45	65	50	55	50	5	20	25	10	55	40	20
10	10	10	5	5	5	5	5	5	5	20	5	5	10	5	5	15
5	10	10	5	10	5	5	-5	5	5	30	5	5	10	5	5	15
0.00	0.00	0.00	0.00	0.00	66.67	8.00	16.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.00	0.00
28.57	77.78	50.00	30.77	33.33	0.00	12.00	14.00	28.57	25.00	33.33	7.14	15.38	0.00	14.29	40.00	70.00
71.43	22.22	50.00	69.23	66.67	33.33	80.00	50.00	71.43	75.00	66.67	92.86	84.62	100.00	85.71	50.00	30.00

ENERGY WEST
 Rilda Canyon
 Roadway Slopes
 Sample Date: Aug. 3-7 1998
 Exposure: East
 Slope: 10-20 deg.

Mean	SDev	Freq	
TREES & SHRUBS			
0.33	1.80	3.33	Abies concolor
1.00	3.27	10	Mahonia repens
0.10	0.54	3.33	Populus tremuloides
0.07	0.36	3.33	Ribes aureum
1.00	3.00	13.33	Rosa woodsii
FORBS			
0.33	1.80	3.33	Cynoglossum officinale
0.50	2.69	3.33	Geranium richardsonii
1.50	2.93	23.33	Hedysarum boreale
1.67	5.22	10	Medicago sativa
6.77	7.50	56.67	Mellilotus officinalis
0.17	0.90	3.33	Penstemon eatonii
0.57	1.52	13.33	Penstemon palmeri
0.23	0.96	6.67	Sanquisorba minor
GRASSES			
0.17	0.90	3.33	Bromus inermis
2.33	6.67	20	Elymus cinereus
1.33	2.87	20	Elymus elymoides
16.17	18.42	63.33	Elymus lanceolatus
7.10	8.90	50	Elymus smithii
1.00	5.39	3.33	Elymus spicatus
COVER			
42.67	13.09		Total Living Cover
41.17	16.52		Erosion Control Mat
8.17	4.18		Bareground
8.00	6.00		Rock
% COMPOSITION			
6.65	16.24		Shrubs
27.69	20.95		Forbs
64.99	19.90		Grasses

UP&L-RILDA CANYON

Aspen/Fir/Dogwood

Reference Area

Slope:

Exposure: Variable

Sample Date: 31 Aug. 1990

	1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00	9.00	10.00	11.00	12.00	13.00
SHRUBS													
<i>Abies concolor</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	40.00	0.00	0.00	27.00	0.00	0.00
<i>Cornus stolonifera</i>	0.00	0.00	10.00	0.00	28.00	15.00	15.00	0.00	0.00	0.00	0.00	12.00	8.00
<i>Acer grandidentatum</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Physocarpus malvaceus</i>	0.00	0.00	0.00	0.00	5.00	13.00	15.00	0.00	10.00	5.00	0.00	0.00	0.00
<i>Juniperus communis</i>	20.00	12.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Mahonia repens</i>	25.00	15.00	2.00	2.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00	7.00
<i>Pachystima myrsinites</i>	5.00	5.00	7.00	0.00	0.00	5.00	5.00	10.00	5.00	5.00	0.00	10.00	0.00
<i>Rosa woodsii</i>	2.00	10.00	0.00	0.00	0.00	0.00	0.00	10.00	5.00	4.00	10.00	5.00	0.00
<i>Symphoricarpos oreophilus</i>	0.00	0.00	0.00	3.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	20.00
<i>Populus tremuloides</i>	3.00	0.00	10.00	5.00	0.00	0.00	0.00	0.00	3.00	0.00	0.00	0.00	0.00
<i>Juniperus scopulorum</i>	0.00	0.00	0.00	0.00	0.00	10.00	0.00	0.00	0.00	0.00	5.00	0.00	0.00
<i>Shepherdia canadensis</i>	0.00	0.00	0.00	0.00	0.00	0.00	10.00	0.00	5.00	0.00	0.00	0.00	0.00
<i>Amalanchier utahensis</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00
FORBS													
<i>Veratrum californicum</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00
<i>Apocynum sibiricum</i>	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Osmorhiza occidentalis</i>	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Smilacina stellata</i>	0.00	3.00	6.00	5.00	2.00	2.00	0.00	0.00	0.00	0.00	0.00	3.00	5.00
<i>Lathrus lanszwertii</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00
<i>Geranium richardsonii</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GRASSES													
<i>Poa fendleriana</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.00	0.00	0.00
<i>Bromus carinatus</i>	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	1.00	3.00	0.00	0.00
COVER													
Total Living Cover	60.00	45.00	35.00	17.00	40.00	45.00	45.00	70.00	30.00	15.00	55.00	35.00	40.00
Litter	38.00	54.00	64.00	82.00	44.00	50.00	54.00	29.00	64.00	84.00	35.00	64.00	59.00
Bareground	1.00	1.00	1.00	1.00	15.00	1.00	1.00	1.00	1.00	1.00	10.00	1.00	1.00
Rock	1.00	0.00	0.00	0.00	1.00	4.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00
% COMPOSITION													
Shrubs	91.67	93.33	82.86	58.82	95.00	95.56	100.00	100.00	93.33	93.33	76.36	77.14	87.50
Forbs	8.33	6.67	17.14	29.41	5.00	4.44	0.00	0.00	6.67	0.00	0.00	22.86	12.50
Grasses	0.00	0.00	0.00	11.76	0.00	0.00	0.00	0.00	0.00	6.67	23.64	0.00	0.00

UP&L-RILDA CANYON

Aspen/Fir/Dogwood

Reference Area

Slope:

Exposure: Variable

Sample Date: 31 Aug. 1990

Mean	SDev	Freq	
SHRUBS			
5.87	10.71	33.33	Abies concolor
8.03	12.18	53.33	Cornus stolonifera
1.43	3.77	13.33	Acer grandidentatum
6.60	12.02	40.00	Physocarpus malvaceus
1.40	4.42	6.67	Juniperus communis
2.87	5.58	33.33	Mahonia repens
2.63	3.14	46.67	Pachystima myrsinites
2.63	3.42	43.33	Rosa woodsii
2.43	6.54	20.00	Symphoricarpos oreophilus
2.03	4.35	26.67	Populus tremuloides
0.50	1.98	6.67	Juniperus scopulorum
0.83	2.61	10.00	Sheperdia canadensis
0.17	0.90	3.33	Amalanchier utahensis
FORBS			
0.17	0.90	3.33	Veratrum californicum
0.10	0.54	3.33	Apocynum sibiricum
0.20	0.60	10.00	Osmorhiza occidentalis
1.23	1.93	33.33	Smilacina stellata
0.07	0.36	3.33	Lathrus lanszwertii
0.33	1.07	10.00	Geranium richardsonii
GRASSES			
0.33	1.80	3.33	Poa fendleriana
0.87	1.52	30.00	Bromus carinatus

COVER

40.73	14.36	Total Living Cover
50.47	18.02	Litter
4.77	11.85	Bareground
4.03	5.88	Rock

% COMPOSITION

90.78	9.58	Shrubs
5.83	7.30	Forbs
3.38	6.37	Grasses

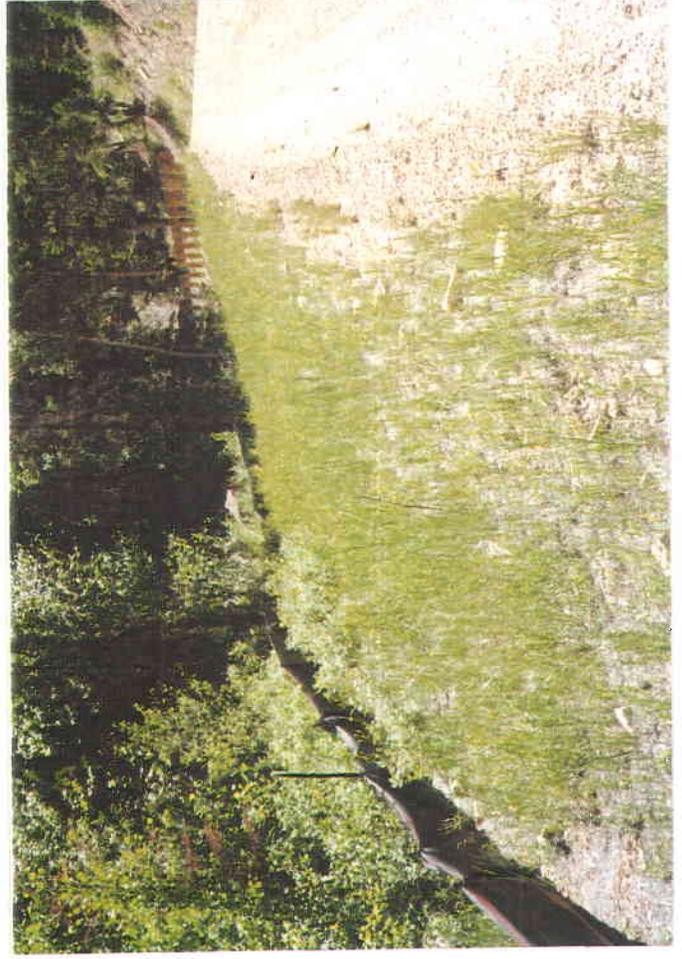
COLOR
PHOTOGRAPHS



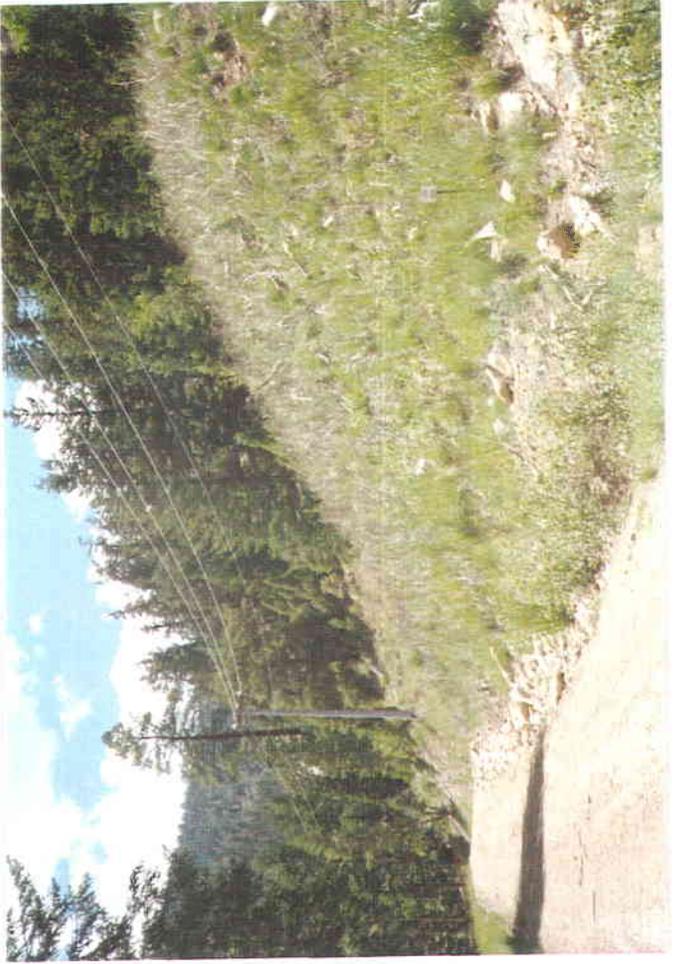
Rilda Canyon - Pad Area Slopes '96 (1 of 2)



Rilda Canyon - Pad Area Slopes '96 (2 of 2)



Rilda Canyon - Roadway Slopes '96



Rilda Canyon - Top Soil Pile '95